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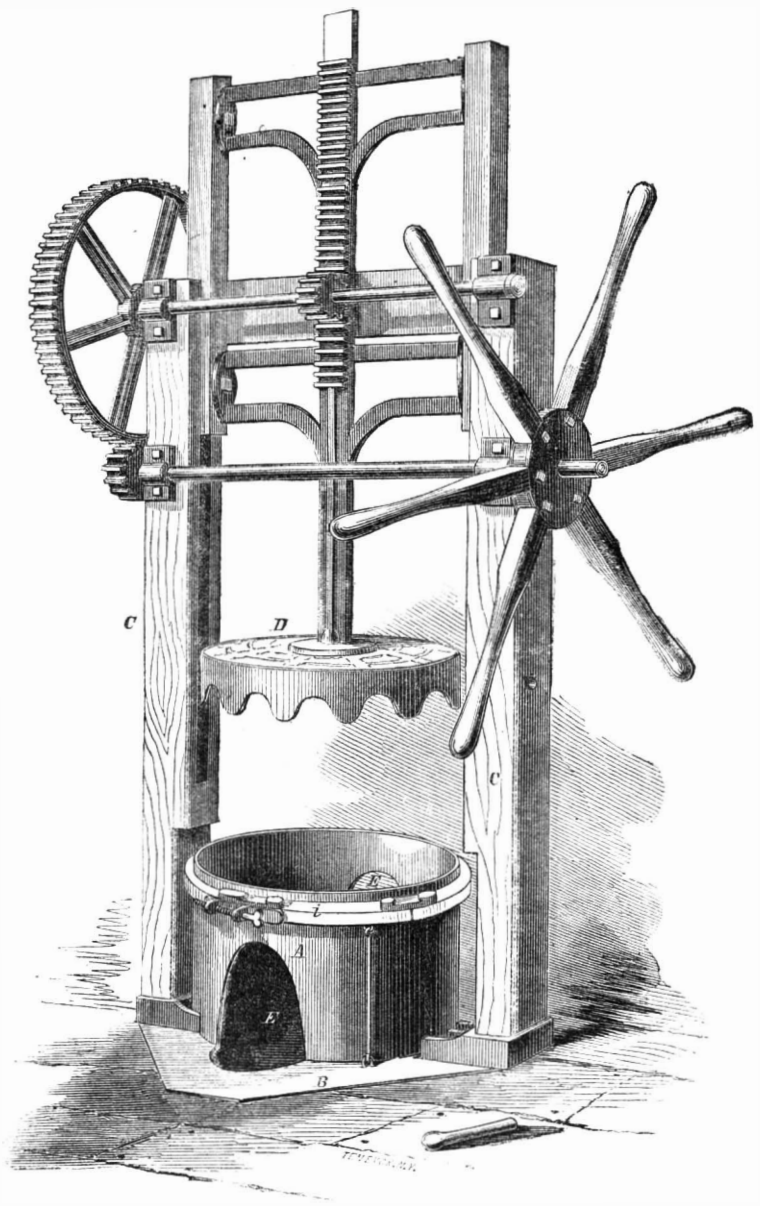
IMPROVED COTTON-PACKER.

Custom requires Sea Island cotton to be packed in round bags about 8 feet long and 30 inches in diameter. This is a heavy tax upon the planters. It often takes a man and helper a whole day to fill a single bag. It takes some sixty or seventy thousand bags to hold the yearly crop of these fine cottons in the United States.

As no suitable machine has hitherto been supplied for this work, it has been necessary for the negro to get into the bag while it is suspended through a hole in the floor, and as the cotton is handed to him to pack it down with his feet, and also pound it with a long, heavy, iron pestle. The strongest and most reliable hands are required for this work. The stifling dust and fine particles of cotton beaten up by this mode of packing and necessarily inhaled by the negro, and the exposure of his person after becoming heated by labor to the cold air which strikes upon him when he has worked himself partly out of the bag, often results in pneumonia, which has thus destroyed many valuable lives. Mr. Lewis S. Chichester, a mechanical engineer of this city, has invented a simple and efficient machine for this work, which we will proceed to describe.

A thin, cast iron cylinder, A, something less than 30 inches in diameter, and 20 inches high, is placed over a corresponding opening in the floor of the gin house. The bottom of this cylinder is surrounded by a broad flange, B, which sustains, from opposite sides, two strong vertical posts of wood, C C. These posts furnish guides for the arms of a rack, to the lower end of which a circular plunger, D, is secured. This rack and plunger are worked up and down by a pinion suitably geared. Openings, E E, are left in the wall of the cylinder and through the flange at two opposite points, midway between the posts. These openings allow the end of the bag to assume its proper shape, and also allow it to stretch out to its full size as it is packed throughout its length.



CHICHESTER'S COTTON-PACKER.

The bag to be filled is turned inside out and slipped down in folds over the outside of the cylinder, bringing the bottom of the bag into position to receive the cotton. The bag is then clasped to the outside of the cylinder by means of a jointed hoop, *i*, which surrounds it and is drawn tight by means of a thumbscrew arranged for that purpose. The cotton is thrown into the bag and is pressed into it by the plunger as it is worked downward. The plunger is then raised and a new supply of cotton thrown in, which is likewise pressed into the bag by the return of the plunger. As this operation is repeated the bag is packed, and the hoop being so adjusted as to allow the bag to slip or render over the top edge of the cylinder, at each return of the plunger, it is forced down gradually through the cylinder and floor, and when fully packed falls into the room below. A bag of cotton is thus properly packed in about an hour by one man, without injury to the staple.

The patent for this invention was secured, through the Scientific American Patent Agency, Dec. 20, 1859, and persons desiring further information in relation to it will please address the inventor, Lewis S. Chichester, or H. G. Evans, 85 Maiden Lane, New York, who has an interest in the invention.

Messrs. Erwin & Hardee are proprietors of this patent right for the States of Georgia and Florida, and inquiries in relation to the matter in those States may be addressed to them at Savannah, Ga., where they manufacture the presses.

MORDANT FOR CALICO-PRINTING.—A patent has been secured by Mr. Walter Crum, an eminent color chemist of Thornliebank, Scotland, for a very novel mordant for fixing colors in printed and other muslin goods. He mixes gluten with caustic potash or soda, or with the silicate of potash or soda, and prints this on the fabric or impregnates it with such a solution; then the fabric is afterwards submitted to the joint action of heat and moisture before the coloring matter is applied. The process is described in *Newton's London Journal of Arts*, and we would direct the attention of our calico-printers to it (especially those engaged on the finer styles), as it is one of the most peculiar and original chemical discoveries which has been made for many years. He first takes the gluten of wheat, which is produced by the well-known process of kneading flour with water and washing away the starch, then allowing the gluten to remain in a suitable vessel until it has lost its tenacious character and has acquired, in some measure, the quality of common mucilage. The period at which this change takes place varies with the different kinds of flour and the temperature at which the gluten is kept. It is usually sufficiently fluid after five or six days, when kept at summer heat, and between that period and eight or ten days thereafter it is in the best condition to be used for the purposes of this invention. Then proceed to purify this mucilage by rendering the gluten which it contains again insoluble and coherent, and for that purpose mix it with a solution of carbonate of soda sufficient to saturate the acid which has been formed in it; the point of saturation being indicated by test-paper in the usual way. For 10 lbs. of gluten in this condition, there is usually required 18 oz. of solution of carbonate of soda of the specific gravity of 1·50. The gluten, in becoming again soluble, gradually separates from the soda solution and partially resumes its tenacious and coherent state, and the whole being shaken on a cloth the solution passes away, along with some portions of starch not previously separated. Assuming the above quantities to have been used, the gluten remaining is then to be kneaded or washed with 3 lbs. of cold water, and shaken on a cloth as before and this washing operation is to be performed three times. Ten pounds, by weight, of the purified gluten is to be mixed with 14 oz. of solution of caustic soda of the specific gravity of 1·080. The gluten immediately dissolves and forms a mucilage which is to be diluted with water to the required thickness, as is understood by calico-printers. For cylinder printing, add seven pounds of water. When the fiber or fabric of cotton or linen has been printed or otherwise impregnated with the compound just described, and dried, it is subjected to the action of steam (or of heated air, more or less moist), then rinsed in water. Dyeing in a preparation of orchil, in the manner well known, or in picric acid, or dinitrophenylic acid, or in the coloring matter obtained from coal tar or from aniline; or the same coloring matters may be applied by printing them upon a fiber or fabric, previously prepared with the glutinous mordant fixed by steam, and, subsequently, again subjecting the printed fabric to steam.

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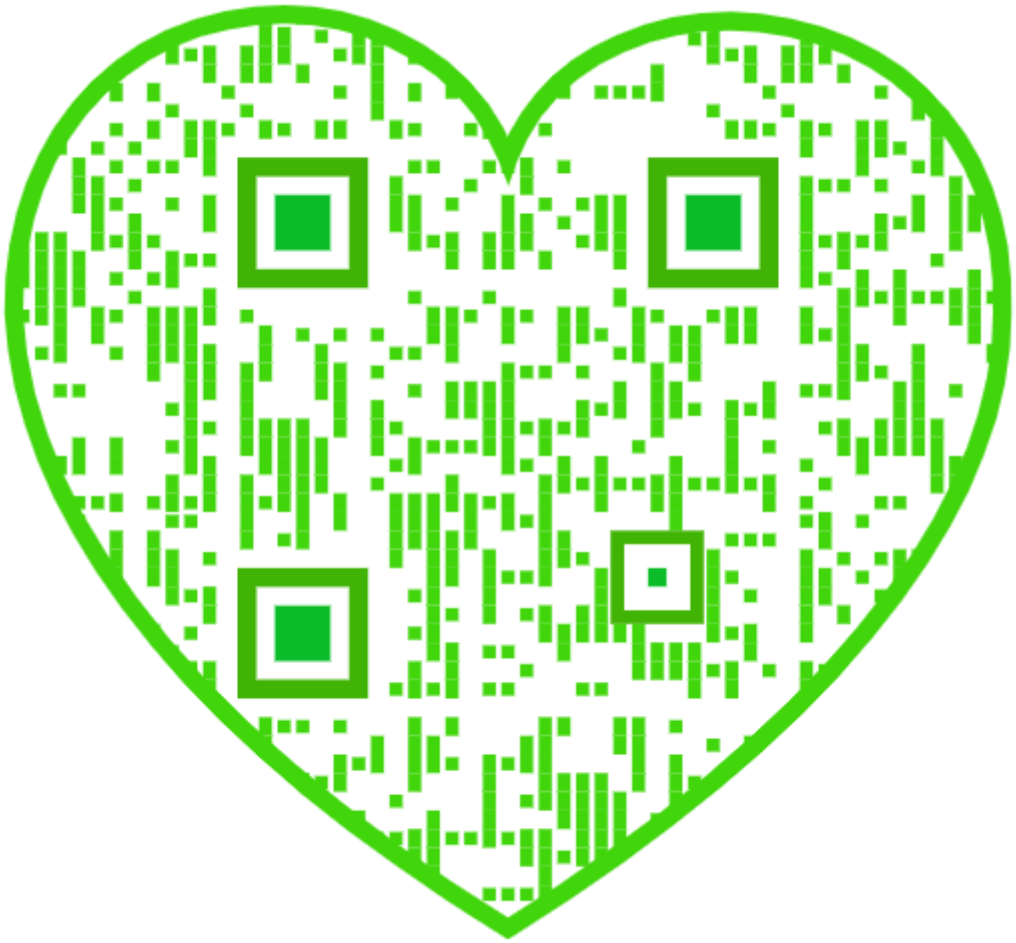

THE PROPOSED CHANGES IN THE PATENT LAW.

We subjoin a full copy of the proposed changes in the Patent laws which are now before Congress for its legislation. Some of our readers will doubtless recognize in this bill the lineaments of an old familiar friend, for, with the exceptions of Sections 10 and 11, it is almost, word for word, the same as that brought before Congress in 1858, and at that time published in the SCIENTIFIC AMERICAN. See Vol. XIII. (old series), page 222.

To the leading features of the bill of 1858 we gave our assent, though it contained some objectionable provisions. We then refrained from entering upon any minute criticism of its merits, because the objections were of a minor character; and because the bill, as a whole, was good, while the chances for its passage were at best very slim. Since that time, however, patent property has risen in value; the number of new inventions patented has greatly increased; and the public, and public men, have manifested a greater interest in patent matters than was ever before observable. We are therefore constrained to believe that there is a real disposition in the present Congress to make such reforms in the laws as may seem to be positively necessary.

The Patent laws now in force are about as complete and perfect, in their practical operation, as any that were ever devised for a similar purpose. Within only fifteen years the receipts of the Patent Office have risen from $40,000 to $240,000, and the number of patents annually granted has increased from 500 to 4,500. What better evidence could there be of the practical excellence of the current system than facts like these? When, year by year, we witness the wonderful strides in improvements which our people are making, under the auspices of these same Patent laws, why should we ask for any changes? Why not "let well enough alone"? These are questions that will at once suggest themselves to the mind of every patriotic legislator. We have no idea that the present Congress will pass any bill without the most thorough examination of its provisions, and a most rigid pruning of its excrescences.

The bill now presented is designed, for the most part, to facilitate the Patent Office in the execution of the present laws, by providing the necessary means for properly conducting the greatly increased business which these laws have brought to its doors. We should be satisfied if the scope of the bill were wholly confined to this object. But certain other amendments have been added which will do good if adopted, and still others which it would be wise to reject.

We annex the bill, and, section by section, we have interposed brief suggestions under each, so that, as they pass in review, our readers may have a correct understanding of the changes proposed and their probable effects.

NOTE.—The words enclosed between brackets denote the original phraseology of the bill, and the words printed in *italics* indicate the clauses substituted as amendments.

A BILL

IN ADDITION TO "AN ACT TO PROMOTE THE PROGRESS OF THE USEFUL ARTS."

Section 1. *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the Commissioner of Patents may establish rules for taking affidavits and depositions required in cases pending in the Patent Office, and such affidavits and depositions may be taken before any justice of the peace, or other officer authorized by law to take depositions to be used in the courts of the United States, or in the State courts of any State where such officer shall reside; and in any contested case pending in the Patent Office it shall be lawful for the clerk of any court of the United States for any district or territory, and he is hereby required, upon the application of any party to such contested case, or the agent or attorney of such party, to issue subpoenas for any witnesses residing or being within the said district or territory, commanding such witnesses to appear and testify before any justice of the peace, or other officer as aforesaid, residing within the said district or territory, at any time and place in the subpoena to be stated; and if any witness, after being duly served with such subpoena, shall refuse or neglect to appear, or, after appearing, shall refuse to testify (not being privileged from giving testimony), such refusal or neglect being proved to the satisfaction of any judge of the court whose clerk shall have issued such subpoena, said judge may thereupon proceed to enforce obedience to the process, or to punish the disobedience in like manner as any court of the United States may do in case of disobedience to process of subpoena and testificandum issued by such court; and witnesses in such cases shall be allowed the same compensation as is allowed to witnesses attending the courts of the United States: *Provided*, That no witnesses shall be required to attend at any place more than forty miles from the place where the subpoena shall be served upon him to give a deposition under this law: *Provided, also*, That no witness shall be deemed guilty of contempt for refusing to disclose any secret invention made or owned by him: *And provided, further*, That no witness shall be deemed guilty of contempt for disobeying any subpoena directed to him by virtue of this act, unless his fees for going to, returning from, and one day's attendance at the place of examination shall be paie or tendered to him at the time of the service of the subpoena.

The propriety of compelling the attendance of witnesses in patent cases was so fully discussed and endorsed in our last number that no further remark is now necessary.

Sec. 2. *And be it further enacted*, That, for the purpose of securing greater uniformity of action in the grant and refusal of Letters Patent, there shall be appointed, in the same manner as now provided by law for the appointment of examiners, a board of three examiners-in-chief, at an annual salary of three thousand dollars each, to be composed of persons of competent legal knowledge and scientific ability, whose duty it shall be, on the written petition of the applicant for that purpose being filed, to revise and determine upon the validity of decisions made by examiners when adverse to the grant of Letters Patent; and also to revise and determine in like manner upon the validity of the decisions of examiners in interference cases, and to perform such other duties as may be assigned to them by the Commissioner; that from the decisions of this board appeals may be taken to the Commissioner of Patents in person upon payment of the fee hereinafter prescribed; that the said examiners-in-chief shall be governed in their action by the rules to be prescribed by the Commissioner of Patents. No appeal shall hereafter be allowed from the decision of the Commissioner of Patents, except in cases pending prior to the passage of this act.

So onerous have the duties of the Commissioner become, under the pressure of the increased business, that of late he has been compelled to call to his assistance three of the most experienced Examiners in the department, and they constitute what is now known at the Patent Office as the "Board of Appeals." The Board hears and reads all the cases that were formerly heard personally by the Commissioner, thus relieving him from a service that has become physically impossible for him to discharge. The Board reports to the Commissioner, who confirms or rejects its decisions. The above section, so far as it gives public recognition and permanence to this Board, and increases the salaries of its members, is judicious, and its adoption is much needed. But we see no propriety in burdening the Board with the additional labor of deciding interferences, when it is *barely able to keep pace with the business of rejected cases.* A second Board, confining its duties solely to the decision of interferences, might perhaps be profitably employed.

Nor do we see the propriety of exacting a fee of $20 for an appeal to the Commissioner in person. The applicant enjoys that advantage now, in substance, and, assisted by the Board, the Commissioner has so far experienced no difficulty whatever in disposing of all the appeal cases.

We are likewise unable to see any good reason for depriving the applicant of the right which he now enjoys, of taking an appeal to the judges of the District Court, in Washington City. These judges are appointed for life. They are not subject to the whims of political partizanship, nor are they governed or influenced by the fluctuating opinions upon patent law which float in the atmosphere of the Patent Office. But removed from the excitements, cares and interruptions of the department, in the quietude of their own homes, the judges examine and carefully decide the cases that are sent to them, on appeal, by the Commissioner. Interests of momentous importance to the inventor reach a final solution in their hands. Many errors committed by the Patent Office have been brought to light and corrected by this method of appeal. Justice, which Commissioners have erroneously refused, has been promptly obtained at the District Court. This system of appeal works well and gives general satisfaction. Why deprive the inventor of so efficient and inexpensive a safeguard of his rights?

It is alleged that the Commissioner and other officials are put to much inconvenience by being compelled to send the models and papers in appeal cases out of the Office to the judges' chambers. But we think that much of the inconvenience complained of has been occasioned by the Patent Office itself in making stupid and unjust decisions. If the Commissioner and his subordinates would pay closer attention to the mandates of the judges, there would be more uniformity in decisions and less trouble occasioned to all the parties concerned. Courts of Appeal are commonly maintained for the express purpose of giving uniformity to the decisions of the lower courts. But the above section is based upon the absurd expectation of obtaining uniformity by abolishing the right of appeal, and *allowing each Commissioner to be the final arbiter of his own decisions.* Past experience shows that this is the very way to induce non-uniformity. Multitudes of instances might be cited where Commissioners have decided one way on one day and just the contrary at another time—where the decisions of the incumbent of to-day have been disregarded by his successor on the morrow. So long as the Commissionership is used as a political bait or as a reward for partizan zeal, subject to constant change of persons, and held by the same individual for only a few months at a time, how can uniformity of decisions be, by any possibility, maintained, except through the medium of a final appeal to some authority other than that of the Commissioner, like that which the law now gives?

Sec. 3. *And be it further enacted*, That no appeal shall be allowed to the examiners-in-chief from the decisions of the primary examiners, except in interference cases, until after the application shall have been twice rejected; and the second examination of the application by the primary examiner shall not be had until the applicant, in view of the references given on the first rejection, shall have renewed the oath of invention, as provided for in the seventh section of the act entitled "An act to promote the progress of the useful arts, and to repeal all acts and parts of acts heretofore made for that purpose," approved July fourth, eighteen hundred and thirty-six.

This section re-enacts what is already in vogue. Under the present rules of the Patent Office, the case must have been twice rejected, and the oath renewed, before an appeal can be taken.

Sec. 4. *And be it further enacted*, That the salary of the Commissioner of Patents shall [from and after the commencement of the present fiscal year] be [five thousand dollars] *four thousand five hundred dollars* per annum, and the salary of the chief clerk of the Patent Office shall be [the same as that of principal examiner] *two thousand five hundred dollars per annum.*

The present salary of the Commissioner is $3,000 per annum. For these days of expensive living, the proposed increase is little enough.

Sec. 5. *And be it further enacted*, That the Commissioner of Patents is authorized to restore to the respective applicants, or when not removed by them, to otherwise dispose of such of the models belonging to rejected applications as he shall not think necessary to be preserved. The same authority is also given in relation to all models accompanying applications for designs. He is further authorized to dispense in future with models of designs when the design can be sufficiently represented by a drawing.

There are nearly as many rejected models stored at the Patent Office as patented. The building has been quadrupled in size within ten years; but the number of models received has been in a far greater ratio than the increased space provided. The rejected models are of no use to any one but the owners, who, in most cases, want them returned. The removal of these models has become a positive necessity. By all means, adopt this section.

Sec. 6. *And be it further enacted*, That the tenth section of the act approved the third of March, eighteen hundred and thirty-seven, authorizing the appointment of agents for the transportation of models and specimens to the Patent Office, is hereby repealed.

The Commissioner of Patents is hereby authorized to employ a clerk of the third class to frank such letters and documents as he is by law permitted to frank, and to perform such other duties as the Commissioner may assign him.

The Commissioner is further authorized, from time to time, to appoint, in the manner already provided for by law, such an additional number of principal examiners, first assistant-examiners, and second assistant-examiners, as may be required to transact the current business of the Office with dispatch, provided the [annual expenses of the Patent Office shall not exceed the annual receipts] *whole number of additional examiners shall not exceed four of each class.*

We say amen to all of this. Let the Patent Office be well provided with help, so that all applicants shall have their cases promptly disposed of. With this additional aid, the Examiners will be better able to attend to the interferences than the present Board.

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Sec. 7. *And be it further enacted*, That the Commissioner of Patents may require all papers filed in the Patent Office to be correctly, legibly and clearly written; and for gross misconduct he may refuse to recognize any person as a patent agent, either generally or in any particular case; but the reasons of the Commissioner for such refusal shall be duly recorded, and subject to the approval of the President of the United States.

The Commissioner already has power to require all papers to be correctly, legibly and clearly written. No further legislation is wanted on that point. As to gross misconduct on the part of agents, the Patent Office, instead of asking for Congressional aid, should seek the assistance of the local Chief of Police. The instances of gross misconduct are exceedingly rare.

Sec. 8. *And be it further enacted*, That no money paid as a fee on any application for a patent after the passage of this act shall be withdrawn or refunded, nor shall the fee paid on filing a caveat be considered as part of the sum required to be paid on filing a subsequent application for a patent for the same invention.

That the three months' notice given to any caveator, in pursuance of the requirements of the twelfth section of the act of July fourth, eighteen hundred and thirty-six, shall be computed from the day on which such notice is deposited in the Post-office at Washington, with the regular time for the transmission of the same added thereto, *which time shall be indorsed on the notice;* and that so much of the thirteenth section of the act of Congress, approved July fourth, eighteen hundred and thirty-six, as authorizes the annexing to Letters Patent of the description and specification of additional improvements is hereby repealed.

The existing law permits rejected applicants to withdraw two-thirds of the official fee. But very many never avail themselves of the provision, hoping some time to get their patents through. A hundred thousand dollars and over, due to rejected applicants, remains, and has remained for years, uncalled for at the Patent Office. This section should be adopted.

Sec. 9. *And be it further enacted*, That all laws now in force fixing the rates of the Patent Office fees to be paid are hereby repealed, and in their stead the following rates are established:

On filing each caveat, ten dollars;

On filing each original application for a patent, except for a design, twenty [five] dollars;

On issuing each original patent, [five] *ten* dollars;

On every appeal from the examiners-in-chief to the Commissioner, twenty dollars;

On every application for a patent for a design, fifteen dollars;

On every application for the re-issue of a patent, thirty dollars;

On every application for the extension of a patent, [one hundred] *fifty dollars; and fifty dollars, in addition, on the granting of every extension;*

On filing each disclaimer, ten dollars;

For certified copies of patents, and so forth, twelve cents per hundred words;

For recording every assignment, agreement, power of attorney, and so forth, of three hundred words or under, one dollar;

For recording every assignment, and so forth, over three hundred and under one thousand words, two dollars;

For recording every assignment or other writing, if over one thousand words, three dollars;

For copies of drawings, the reasonable cost of making the same.

The principal change contemplated by this section is the establishment of a uniform rate of charge to all applicants for patents, *without regard to nationality.* We believe that all civilized governments except Canada and the United States have a uniform rate. In Great Britain, France, Austria, Australia, Russia, Prussia, &c., an American can obtain a patent on the same terms as any of the citizens of those countries. But in Canada, none but a resident John Bull can obtain a grant at all; while in the United States, we charge our own citizens $30; a Frenchman, German, Pole or Austrian, $300; and an Englishman—a son of our mother-land, whence we derived our system of Patent laws—$500. This is a most odious discrimination, and is a foul blot upon our national escutcheon. We ask for its immediate removal.

Sec. 10. *And be it further enacted*, That in all cases where an application shall be made for a patent which would interfere with any other patent for which an application may be pending, or with any unexpired patent which shall have been granted, the person who, previous to the application of either party, for a patent, first filed a caveat describing the invention, in accordance with the provisions of the twelfth section of the act of Congress entitled "An act to promote the progress of the useful arts, and to repeal all acts and parts of acts heretofore made for that purpose," approved July fourth, eighteen hundred and thirty-six; and in case no caveat has been so filed, the person who first completed and presented to the Commissioner his application for a patent for such invention shall, as between said interfering applicants, be deemed and held to be the first and original inventor thereof, unless it be shown by the testimony submitted that said person was not *an original and bona-fide inventor* of said invention, or that he obtained the knowledge of said invention directly or indirectly from some other person: *Provided*, nothing herein contained shall effect any interference case now pending.

One of the practical workings of the plan contemplated in Section 10 may be illustrated by supposing that two inventors arrive in Washington with a similar invention, and simultaneously start from the hotel for the Patent Office. Mr. Nimblefoot, young and active, rapidly skips over the pavement, mounts the marble steps of the department, files his caveat, pays the fee, and makes his exit. Five minutes later Mr. Deepthought arrives, having been unable, through bodily infirmity (being a little lame), to keep pace with his more fleet companion. But now the doors are shut. The hour of 3 has struck; the official sun has set. Too late by five minutes! Fruitless is the toil of the midnight hour, and blasted the fondest hopes of life. The inexorable law awards the patent to Nimblefoot, leaving Deepthought to struggle in the depths of despair.

The present law is, that on the filing of a caveat, and during its pendency, the caveator shall be entitled to due notice of any application that may be made for a patent for a similar device, that the said application shall be postponed until the caveator has had time to put in a model and full specification; after which, interference is to be declared and whoever proves priority of invention shall receive the patent. This is a good law, works well, produces no confusion, and is calculated to do even-handed justice to the inventor and all concerned.

The courts, under the existing laws, hold that in a race of diligence, he is the prior inventor who first *reduces the thing to actual practice*; but the proposed new section declares that he who contrives first *to slip in a caveat*, "shall be deemed and held to be the first and original inventor." The odds are thus all thrown in favor of Mr. Nimblefoot, at the expense of the more plodding men of genius, the future Whitneys, Morses, and McCormicks.

The adoption of Section 10 would certainly greatly lessen the duties of the officials in the Patent Office. But if this is the prime object sought, we might better go back to the old system of granting patents without examination. The object of our present law is to endeavor to allow no patents to issue but such as are valid and will be sustained by the courts. For this purpose labor and expense are freely encountered; and the cases are closely scanned to ascertain, if possible, whether the patent sought will be of any value to the patentee, or whether, by granting the patent, the Office is conferring upon him the worthless privilege of bringing suits which can never be sustained. One thing, at least, seems very clear to us; and this is that the rules observed in the Patent Office should be followed by the courts. Why should one rule prevail in granting a patent and another in sustaining it? If there is danger of perjury in the Patent Office, there is (or ought to be) the same danger in the courts. Evidence ought to be taken in both cases under the same solemnity, and perjury punished by the same penalty. If, therefore, the patent is to be granted to him who first files his caveat or first makes his application, the courts should follow the same rule and hold all such patents valid, irrespective of the question of priority of invention. But should he who files his application on Monday have such an advantage over him who, from remoteness of distance or any other cause, happened to be so unfortunate as not to present his case till Tuesday? Or should he who, before he completes his invention, hastens to the Office with his caveat, be so much more favored than he who, more cautious and particular, shall wait till he has completed his invention before he applies to the Office, irrespective of the date of the actual invention? Such is not the dictate of our own reason on the subject. The same objection suggests itself to our minds against having this kind of property to be decided by the result of a scramble as would exist in regard to any other property. In all cases it seems more in accordance with the rules and practices observed by those nations who have advanced beyond the savage state, that something besides the fact of mere actual possession should be taken into the account in determining the rights of contesting parties. Nor does there seem to us anything in the nature of this species of property that should make it an exception to the general rule on this subject. A patent for an invention actually made should not be defeated by the discovery of some forgotten suggestion which was never made practically useful; nor should a person be allowed to claim priority of invention over a patentee of two years' standing. But, still, to leave the matter entirely dependent upon the date of the application to the Patent Office, seems to us wholly unjust and inexpedient. It would be giving an undue advantage to him who resides nearest to the Patent Office, or who best understood the law or the rules on this subject, or who was the most venturesome in risking his money while the success of his contrivance was still uncertain. At least a reasonable time should be given to an inventor for quietly and cautiously completing the invention and presenting his application before any prejudice is wrought to him on the ground of negligence. The law should encourage the doing of all these things in an orderly and quiet manner. Nor does it seem to us that the amount of litigation is to be diminished by the proposed change. The best mode of preventing litigation is to provide, in the first instance, for securing justice. If a patent is granted to the first applicant without allowing inquiry whether he was the first inventor, the courts must either declare the patent good although the patentee was not the first inventor, or they must permit proof of prior invention to defeat the patent given to the first applicant. The former of these two courses cannot be pursued without a radical departure from all the rules observed on this subject by all civilized nations. The latter would be providing the same harvest of litigation that would result from the granting of patents without examination or question. The Office would not have attempted to separate the good from the bad by the application of those rules which will prevail in the courts when they have the patents before them on questions involving their validity, and the disposition to call in question that validity would not be counteracted in the least by the moral effect of an official decision. We have confidence in the intelligence of Congress, when they have once fairly taken the subject into consideration; and with the alteration of the law of evidence, as proposed in Section 1, we are fully of the opinion that Section 10 should be discarded, and that the Office should look into the date of an invention, guided by the same rules as will afterwards control the courts.

We reiterate that the present laws in regard to caveats, in regard to the filing of applications for patents, in regard to interferences, and in regard to the settlement of the question of priority of invention, are founded in wisdom, are working with success, are free from the objections connected with Section 10, give general satisfaction, and therefore should not be materially changed.

Sec. 11. *And be it further enacted*, That any citizen of the United States, or alien who has resided therein one year prior to the application herein mentioned, who shall make, or cause to be made, at his or their own cost and expense, by modeling, carving, engraving, forging, or chasing, in any material, a new and original pattern or die, or set of new and original patterns or dies, from which articles may be multiplied by moulding, casting, electrotyping, or other analogous means for copying the original, or forming a reverse thereof, shall, on depositing with the Commissioner of Patents a specimen, accompanied by an application and oath or affirmation of the applicant that he is the legal proprietor of the pattern or die, or sets thereof thus produced, together with a certificate of deposit in the treasury of the United States of a fee of ten dollars, it shall be the duty of the Commissioner of Patents to have the same duly registered and numbered, and the specimens preserved in the Patent Office until the term of the registry expires, and to deliver to said applicant a certificate of such registry conferring upon him and his legal representatives the exclusive right to multiply and sell copies of said pattern or die, or sets thereof, for the term of fourteen years, under the same restrictions and penalties for infringement as are now provided for in cases of infringement of Letters Patent for inventions in the useful arts: *Provided*, That upon each of the articles or copies thus protected there shall be marked the letter "R," enclosed in a geometrical figure, as indicated upon the certificate of registry.

If this section is especially designed to protect our home manufacturers, the usual requirement as to having taken the oath of intended citizenship should be inserted. This section seems to be, in effect, an extension of the life of design patents from 7 to 14 years. The spirit of this section is liberal and its adoption might prove beneficial.

Sec. 12. *And be it further enacted*, That all applications for patents shall be completed and prepared for examination within two years after the filing of the petition, and in default thereof, they shall be regarded as abandoned by the parties thereto; and all applications for the extension of patents shall be filed at least ninety

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days before the expiration thereof; and notice of the day set for the hearing of the case shall be published, as now required by law, for at least sixty days.

The existing law touching abandonment, as we have before remarked, covers the whole ground, gives satisfaction, is well understood, insures justice, and needs no change. The proposed change of time on extension notices from 60 to 90 days, amounts to a deprivation of one month to the inventor. It is an unnecessary alteration, and its effects would sometimes be to debar a meritorious applicant from obtaining an extension, which the law, as it stands, would readily grant him.

Sec. 13. *And be it further enacted*, That in all cases where an article is made or vended by any person under the protection of Letters Patent, it shall be the duty of such person to give sufficient notice to the public that such article is so patented, either by stamping thereon the word patented, together with the day and year the patent was granted; or when, from the character of the article patented, that may be impracticable, in the judgment of the Commissioner of Patents, by enveloping one or more of said articles, and affixing a label to the package, or otherwise attaching thereto a label on which the notice, with the date is printed; on failure of which, in any suit for the infringement of Letters Patent by the party failing so to label or stamp the article the right to which is infringed upon, no damage shall be recovered by the plaintiff, except on proof that the defendant was duly notified of the infringement, and continued after such notice to make or vend the article patented. And the sixth section of the act entitled "An act in addition to an act to promote the progress of the useful arts" and so forth, approved the twenty-ninth day of August, eighteen hundred and forty-two, be, and the same is hereby, repealed.

This is intended as a substitute for that section of the existing law which fines a patentee $100 for each patented article that he vends without having stamped the date of the patent upon the article. The change proposed is a good one.

Sec. 14. *And be it further enacted*, That every caveat filed in the Patent Office shall, from and after the expiration of the time in which the caveator is protected thereby, become a part of the public records of said office.

This proviso throws open to the public all expired caveats. At present they are preserved in the secret archives of the Patent Office.

Sec. 15. *And be it further enacted*, That all acts and parts of acts heretofore passed which are inconsistent with the provisions of this act be, and the same are hereby, repealed.

EARLY VEGETABLES.

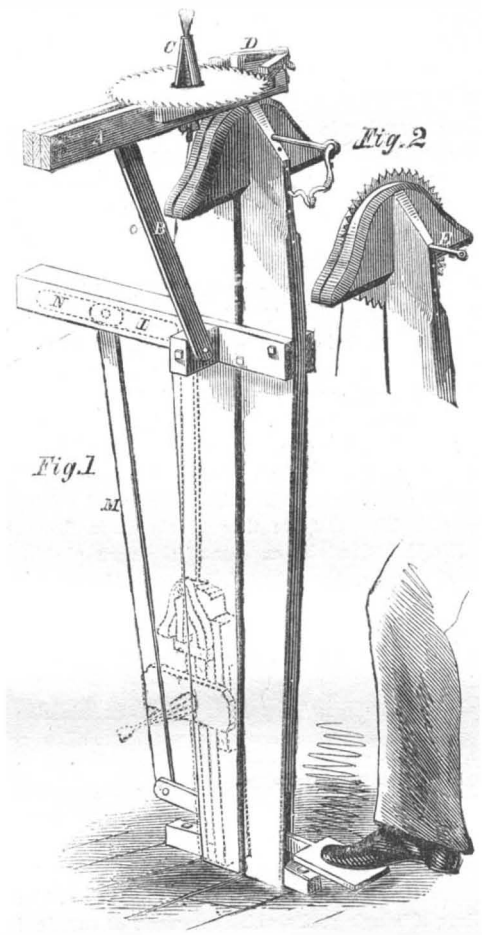
Many farmers are deterred from attempting to produce very early vegetables, by an erroneous idea that the making of a hot-bed is a complicated and difficult operation while it is just as simple as making a hill of corn. Every man who has a garden of whatever size, if he will once try the experiment of making a hot-bed, will, we venture to predict, find the task so easy and the result so satisfactory, that he will never forego the luxury afterwards. All that is necessary is to make a pile of horse manure 2½ feet deep, with the top level or sloping a little to the South, then set a rough frame made of four boards nailed together at the corners upon the bed of manure, fill the frame with 6 inches of garden soil and cover with a window of glass. Any old window will answer the purpose, but it is better to have the bars of the sash run only one way, and to have the glass laid in the manner of shingles.

The best plants to force are tomatoes and cabbages which may be transplanted from the hot-bed to the open ground without any trouble. We have removed tomatoes when they were in blossom, and had them all live. If melons or cucumbers are forced, they should be planted in flower-pots, and in transplanting them you turn the pot over upon your open hand and give it a gentle thump, when the earth comes out in a solid lump and the roots are not disturbed in the least. While the plants are growing, they should be watered frequently, and in warm days the sash should be raised a few inches to give the plants air. We have found the growing of plants under glass, from a small hot-bed, 4 feet by 6, up to a large grapery for raising the black Hamburg and Frontignac grapes, the most satisfactory of all horticultural operations. Having the control of the climate both in heat and moisture, the plants can be made to grow with a vigor which they rarely if ever exhibit in the open air. A hot-bed should be made from four to six weeks before the time for planting corn.

COMBINED VICE AND SAW SET.

The accompanying engravings represent an implement which, from its convenience, is being introduced into the shops for working wood, and is well worthy the attention of those who have saws to file and set.

Fig. 1 represents the setting apparatus arranged for use, and Fig. 2 the vice jaws for holding circular saws to be filled. In the former, the horizontal bar, A, is supported at one end by the brace, B, and at the other by a vertical iron plate, which is fastened rigidly to the bar and grasped by the jaws of the vice. This apparatus is for setting circular saws, the cone, *e*, holding the saw in place by passing through the hole in the center, and being readily adjustable to different sized holes by being raised or lowered by means of the screws at its top and bottom. For saws of different sizes, this cone is placed at the proper point in the slot in the bar, B, to bring the tooth



of the saw exactly over the angle in the anvil. For setting straight saws the ends of the teeth are placed against the brass guides, *d d*, which open at a greater or less angle, and thus permit the tooth to project a greater or less distance past the angle in the anvil.

Fig. 2 shows the manner of holding circular saws to be filed. For this purpose the setting apparatus is removed from the vice (hanging down by the side as shown by the dotted lines), and the saw is grasped between the jaws as shown; the pin, *e*, passing through the arbor hole, several holes being made in the vice to receive the pin with saws of different sizes. The jaws slide into the levers of the vice in dovetail grooves, and for use in filing straight saws the position of the jaws is reversed with their straight edges upward.

The levers of the vice are pressed together by a toggle joint remarkably adapted to this purpose. The two levers, *i* and *n*, connected by a joint in the middle, are acted upon by the treadle through the rod, *m*. When this rod is pressed upward, the toggle forces the jaws together and, being carried a very little past the straight line, holds the jaws in place, the moving lever of the vice being made of wood and somewhat elastic. The jaws are opened by pressing the treadle upward with the top of the foot. Thus the saws are inserted or removed in the shortest possible time, and the implement is exceedingly convenient in use.

A working model is now on exhibition at the Inventor's Exchange of S. A. Heath & Co., No. 37 Park-row, this city. The patent was granted, through the Scientific American Agency, Dec. 27, 1859, and persons desiring further information in relation to the matter, will please address the inventor, Norman Allen, at Unionville, Conn.

DISCOVERIES AND INVENTIONS ABROAD.

Copper Tubes made by Galvanic Process.—Our Parisian cotemporary, *Le Génie Industriel*, publishes the details of a process for making copper tubes without soldering, which consists simply in depositing copper upon lead patterns by the galvanic battery, and then melting out the lead. It is said to work perfectly, and, of course, tubes could be made of any desired form—straight, curved or right-angled. This suggests the idea of forming tubes in the same manner with cores of wax or clay. The clay may be forced into the size of the pipe through a draw plate, then allowed to harden slightly, when it may be covered with plumbago and an electro deposit of copper made upon it with a galvanic battery. When the copper is deposited in sufficient thickness the clay may be removed from the interior by boiling the pipe in water. To conduct this manufacture it would require long depositing troughs, and the expense would probably be too great for making straight copper tubes; but for curved tubes, such as the worms of stills, it would perhaps pay. Curved copper tubes are commonly made by filling straight tubes with hot resin, then twisting the entire tube into its curved form. When the resin becomes cool it is driven out by striking the pipe, which breaks the resin core into small pieces.

Waterproof Varnishes.—Take one pound of flowers of sulphur and one gallon of linseed oil, and boil them together until they are thoroughly combined. This forms a good varnish for waterproof textile fabrics. Another is made with 4 lbs. oxyd of lead, 2 lbs. of lampblack, 5 oz. of sulphur and 10 lbs. of india-rubber dissolved in turpentine. These substances, in such proportions, are boiled together until they are thoroughly combined. A patent has been secured for the application of such varnishes to waterproof fabrics, by N. S. Dodge, of London. Coloring matters may be mixed with them. Twilled cotton may be rendered waterproof by the application of the oil sulphur varnish. It should be applied at two or three different times, and dried after each operation.

Restoring Old India-rubber.—Mr. Dodge has also obtained a patent for restoring old india-rubber to a condition fit for re-manufacture by the application of dry heat. He reduces the material by machinery, in the first place, to a powdery state; then he subjects this, in a suitable oven, to about 300° Fah., and continues the heat until the mass assumes the plastic condition. Superheated steam has been found most convenient to use for the purpose of heating; and by using a double cylinder, with the steam in the outside one and the india-rubber placed inside, the best results have been secured. As gases arise from the india-rubber while it is being heated, these must be permitted to escape by a tube. Superheated steam may also be applied direct to the ground india-rubber. When reduced to a proper plastic state, it is fit for being used to manufacture various articles. It may be combined with 3 lbs. of white lead, 5 oz. of sulphur, 4 lbs. of oxyd of zinc, and half a pound of carbonate of magnesia or lime (chalk) to 10 lbs. of the plastic india-rubber. These are thoroughly kneaded together, and molded or struck by dies into the form of the articles desired, then submitted to the heat of 230° Fah. in an oven to produce the vulcanizing effect.

Gas Regulators.—It has thus far baffled all efforts to obtain a gas regulator that will prevent the jet of light from flickering. Hundreds of devices, we believe, have been tried to secure such a result, and yet our gas lights all flicker in the old-fashioned manner. A new gas regulator has been patented by Samuel Wright, of Sudbury, England (a gas engineer), by which the pressure is governed by passing the gas through a woven texture of linen, cotton, silk or hair into a chamber or chambers to which the burner is attached, the pressure of the gas at the jet of the burner being thereby governed as required. These woven fabrics are stretched in a small chamber (to which the gas is admitted in its passage to the burner) in the form of a diaphragm, through which it must pass before escaping. Instead of one diaphragm of woven fabric, one or two may be interposited, as required. The gas thus constrained to pass through the meshes of the material is diffused and equalized in its pressure, causing, it is stated, the flame to burn steadily and without flickering, thereby effecting a great saving of gas and producing a better light than can be obtained without such governing or regulating, which it effects in a much higher degree than can be secured by other regulators. The regulating diaphragm can be readily cleaned by washing, or a new material may be introduced when required.

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GAS METERS.

We make the following extract from the annual report of John C. Cresson, the engineer of the Philadelphia Gas Works:—

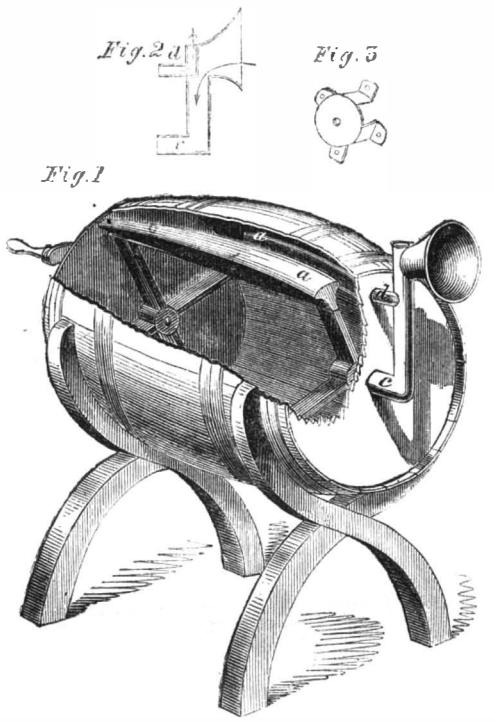
"Among the many subjects of a practical character that engage the attention of the gas engineer, none has given rise to more solicitude than the choice and management of gas meters, upon the accuracy and unvarying action of which the interests of both consumer and producer are in a great degree dependent; the former for his fair and uninterrupted supply of the commodity he pays for, and the latter for securing the due returns for his outlay of material and labor. All these desirable results are obtained in great perfection from the instrument ordinarily known as the wet meter, so long as it is duly protected from frost and evaporative heat. Various contrivances have been suggested and tried for securing the instrument from these injurious influences. The most general practice is the substitution, in part or in whole, of alcohol for water as the hydraulic seal; but while this guards against freezing, it gives rise to much inconvenience by reason of its rapid evaporation and want of specific gravity, which oftentimes cause a sudden obstruction of the flow of gas at the moment when the stoppage is most inconvenient to the consumer. A liquid free from these objections has long been desired, and after numerous experiments I had reason to suppose I had discovered it in the solution of neutral chloride of calcium. Accordingly, in the year 1843, I introduced this liquid into several hundred meters, for the purpose of giving it a fair, practical test. It did not freeze at the lowest natural temperature of our climate, and the strong affinity of the salt for water prevented rapid evaporation; while its specific gravity being greater than that of water, gave full support to the valve-float, and effectiveness to the hydraulic sealing. The results of the first year of trial were entirely satisfactory, and the liquid was then used in all the exposed meters, with equally good results. But the expectations raised by two years of trial were dissipated at the end of the third year; by which time the metals of the meter showed such unmistakeable evidences of the destructive action of the solution as led to its abandonment.

"More recently I have been giving trial to another liquid, with encouraging prospect of success. It is the inert substance obtained from fatty bodies, and known by the name of glycerine; it is capable of resisting our lowest natural temperature, maintains its fluidity very pertinaciously, and is considerably heavier than water. Should it manifest no injurious action on the meter metals, or other defects, it will completely meet the wants of the instrument. A more direct method of escaping these liquid imperfections has been attempted in the so-called dry meter, working on the principle of the ordinary bellows, with diaphragms connected by flexible joints. A trial of these, on a large scale, during the years 1847 and 1848, revealed imperfections which impaired their trustworthiness so greatly as to require their entire disuse. Within a few years sundry improvements have been made in the construction of the dry meter, intended to remove the imperfections before mentioned, which seem to have sufficient merit to justify another trial. This has been in progress for nearly three years, with results, thus far, quite favorable, and if these shall be confirmed by longer and more extensive trial, the annoyances that have so long attended this part of gas machinery, may be happily terminated."

IMPORTANT TO COTTON SHIPPERS—BEWARE OF BULLS' EYES!—It has been observed (says the *New York Tribune*) that the fires which have occurred so frequently in vessels laden with cotton, have been confined principally to American ships, in which the convex side-lights called bulls' eyes, are a peculiarity. Foreign vessels rarely use these lights, and not a single fire has occurred in them at our cotton ports. The theory based on these facts is that the bull's eye acts as a burning lens, whenever the sun chances to shine through it, and will ignite any combustible article that lies within its focus. An incident which lately occurred at Richmond, Va., seems to support this idea. While the schooner *Rosewreath*, of Boston, Capt. Baker, was lying at that port, smoke was discovered issuing from the mate's state-room. On opening the door, the mate's coat, hanging there, was found to be on fire, and extinguished. Some experiments were made, which proved that a bull's eye, on which the sun was shining, was the cause of the fire.

IMPROVED CHURN.

The microscope reveals the fact that butter exists in milk in the form of globules, a portion of which are broken by the process of churning, causing the fatty mass to adhere together, and in this way separating it from the fluid milk; no chemical change taking place. Consequently, a grinding and crushing process accompanying the usual agitation is found to shorten the time required for the separation. The temperature, too, exerts a very great influence on the rapidity of the process, the proper point being somewhere from 55° to 65°, the statements of different makers ranging between these extremes. Since these facts have become generally known, a large number of churns have been invented with a view of rendering them practically available. The one which we illustrate in the annexed engraving is deemed by the inventor more convenient than any heretofore in use.



It is a modification of the barrel churn, the dashers, *a a*, being fashioned to fit very nearly the inner surface of the barrel, and with concave sides for beating the cream. Fig. 2 represents the construction of the tubes, by which a circulation of air is produced, the air entering through the tube, *c*, and passing out through the tube, *d*. Fig. 3 illustrates the step or pivot for supporting the dasher at the tube end of the barrel, it being made to stand out from the barrel head to give room for the entrance of the air behind it. The temperature of the air entering the churn is regulated by the simple plan of placing the apparatus at a greater or less proximity to the stove or fire in the room.

The patent for this invention was issued Dec. 6, 1859, and persons desiring further information in relation to it will please address the inventor, Henry Rohrer, at Strasburg, Lancaster county, Pa.

A FRENCH VELOCIPEDE.—A foreign correspondent informs us that a Frenchman has invented what is called a *barotrope*—a sort of human locomotive—on which a man has sat, walked and wheeled himself along five miles in 35 minutes on the Boulevard Bazar, of Paris, at noon, when the street was most crowded. At another time the same man made 13 miles in 96 minutes, the exercise being so easy that he offered to keep it up alternate hours, day after day, and thought he could without difficulty average about 50 or 60 miles a day. It beats the best "turn-outs" in the streets, if the latter present a paved surface.

A CHICAGO MACHINIST IN CUBA.—We learn that K. McDonald, who left the Eagle Iron Works of Messrs. P. W. Gates & Co., Chicago, last November, with machinery for Cuba, has now in operation one of Mr. Ives Scovill's steam quarry drills, and is working it to entire satisfaction. We also learn that the natives visit him daily and and are quite surprised to find such a working piece of ingenuity and skill, and its being so well adapted for the island of Cuba. Success to our Chicago machinists and their enterprise in Cuba!

PROSPERITY & GRATITUDE OF PATENTEES.

It is cheering to receive intelligence of the prosperity of our friends; and as another evidence of the present demand for patent property, we publish the following letter, as a sample of many which are constantly being received at the office of the Scientific American Patent Agency. While we congratulate the writer in his prosperity, we would thank him for his complimentary remarks:—

MESSRS. EDITORS:—Your kind favor of Jan. 24th came to hand, informing me of your success in procuring my Letters Patent. In a few days after, I received the papers from Washington; and although it is but *ten* days since they arrived, it is with pleasure I state that I am in receipt of upwards of $3,000 for territory sold and all paid. Please accept my thanks for your promptness and perseverance in getting my case through in so short a time; and any future business that I may have for the Patent Office, it will give me pleasure to place in your hands, and at the same time recommend cheerfully all who are in the patent business to do likewise. W. D. BUNTING.

Cleveland, Ohio, Feb. 13, 1860.

After the foregoing was in type we received the following grateful acknowledgements of our professional services:—

MESSRS. EDITORS:—On Feb. 2nd, your note reached me, informing me that my Letters Patent had been ordered to issue; and on the 9th I had the pleasure of receiving the document itself from Washington. I have reason to congratulate myself that, on the occasion of this, my first application for a patent, I confided the case to your hands. I consider the result now attained as a proof of ability on your part, and as an instance of promptitude and diligent attention to matters comparatively small, which demands my warmest acknowledgements. W. A. GIBSON.

46 South-street, New York City, Feb. 13, 1860.

MESSRS. EDITORS:—Your message of the 24th ult., was received in due time, announcing the gratifying news that the Letters Patent were ordered to issue. No one could have been more happy than myself, on the receipt of this cheering intelligence. Fourteen days elapsed before I received the documents from Washington; but then my surprise reached its climax. Such accurate drawings! Such a clear specification! The claims all so perfect! Truly you *do* take an interest in the welfare of your clients. My Letters Patent were received a great deal sooner than I anticipated. I shall recommend your Agency and the SCIENTIFIC AMERICAN to all my friends, whom I can assure will receive marked attention at the offices of Munn & Company.

I have distributed 100 copies of the SCIENTIFIC AMERICAN (No. 7) among my acquaintances—principally mechanics and printers.

I hope, one day, to see your establishment doing the *entire* business of preparing papers for the Patent Office, too much of which is now done by men unfit for that profession, both in principle and ability. I cherish a deep sense of gratitude to you for your very valuable services in my case, and the gentlemanly manner in which I was treated at your office. JOHN W. LATCHER.

Northville, N. Y., Feb. 17, 1860.

MESSRS. EDITORS:—My Letters Patent for an extinguisher for street lamps came to hand on the 17th inst., and would have been acknowledged ere this but for want of opportunity. You have my thanks for the able manner in which you have conducted all the cases I have entrusted to you, and can rest assured that I shall recommend you to all my friends in need of the services of a patent attorney. H. K. SYMMES.

Newton, Mass., Feb. 20, 1860.

The last testimonial comes from a source to which more than usual importance is to be attached, for the writer is not a novice at procuring patents, as the records of the Patent Office, for the last few years, show.

WATER may, under some circumstances, be cooled without freezing to 22°, or even lower. If then suddenly agitated a portion is immediately converted into ice, and the temperature of the whole is raised to 32°.

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LATENT HEAT.

MESSRS. EDITORS:—I have observed in the SCIENTIFIC AMERICAN, at different times, various paragraphs in which latent heat is mentioned as existing in all substances; and from certain answers to questions put to you on this subject by your correspondents, and from my own observations, I am inclined to think it is but imperfectly understood, and those who recognize the truth of the phenomenon are unable to give any solution of the fact. It appears to be one of the mysteries of nature unrevealed to the majority of your readers. All they know is that latent heat does exist, and it has been proved by the fact that a gallon of water, converted to steam at 212°, will heat 5½ gallons of water to 212°; thus affording evidence of latent or concealed heat. Now it appears to me that by giving latent or hidden heat a more appropriate name by a little effort of our reasoning faculties, this hidden heat can be made intelligible to all. I would call this concealed heat *expanded* or *diluted* heat. All bodies absorb heat more or less in proportion to their affinity or attraction for it and their capacity for holding or retaining it; this capacity varies according to the volume or space the body occupies. Steam being more bulky at a high temperature than at a low one, in the form of water, it is capable of retaining more heat in its expanded form than if condensed. By reducing the volume of steam, air, or any other substance capable of compression, to one-half its bulk, the temperature will be increased to double its original heat; if we compress it to one-tenth its volume, the temperature would be in the same ratio, as all the heat is still there, but concentrated, and therefore more intense. If we compress two volumes of air of a given temperature into one volume, we have the same quantity of heat in the one that the two contained before compression. This has been verified by a well known apparatus for producing fire before the discovery of lucifer matches; it consisted of a small brass or iron tube or cylinder, 4 inches long by about ¼-inch bore, fitted with a piston. By placing a piece of tinder or punk in a cavity at the end of the piston, and suddenly forcing the piston to the bottom of the cylinder, the air being compressed and the heat also which the air in the tube contains being concentrated to about one-tenth its original space, it is sufficient to ignite the tinder or punk. There is no heat added by this compression, but what was already there is concentrated. A similar illustration may be made by dissolving salt in water. If we put an ounce of salt in a quart of water, the salt disappears or is absorbed by the water, and is but slightly perceptible to the taste. Now by reducing this volume or taking half the water away by evaporation, what remains will be twice as salt as it was before; if we reduce it enough, we come down to the pure ounce of salt again, except what little may escape with the evaporation. Solids possess this latent heat as well as gases, air, steam, &c., but we cannot make them give it out for want of sufficient power to compress or condense them.

A. F. W.

Philadelphia, Pa., Feb. 18, 1860.

[As our correspondent says, this is a mysterious subject. Many of the manifestations of latent heat are perfectly analogous to the squeezing of water from a sponge by compressing it, but this is not the case with all the phenomena. For instance, water changing into ice converts 140 degress of sensible into latent heat, though its bulk is increased by the change.—EDS.

BELTS FOR DRIVING MACHINERY.

MESSRS. EDITORS:—I noticed an article on page 84, present volume of the SCIENTIFIC AMERICAN, on the above subject, and I made up my mind to give you some of my practical experience with belts and pulleys for transmitting power. I have found that it makes a considerable difference in the power transmitted, according to which side of a belt is placed next to the pulleys. I was one of those who once did as my father did before me; and so I run belts with the rougher side next to the pulleys, thinking they would "hug" tighter, to use a common phrase. A few years ago, having occasion to put in a lot of new belting, I proposed to try the *smooth* side next to the pulleys, most of which were of iron, turned and filed smooth. To my surprise I found that the belts did not require to be so tight, that they did not slip so easily, and were not so liable to crack.

An error is made by many persons in using pulleys, namely, they make the driven pulley too small, thereby getting speed before power. My first experience for myself was running a gang of twelve 7-inch saws and a trimmer 8½-inch with a 4½-inch pulley. I had too much speed and my saws did not run with power to do the work. I then tried a 6-inch pulley, which did better; but still not being satisfied, I had a 7-inch iron one put on, which drove the saws with sufficient power to do all the work.

In regard to purchasing belting, I believe that the best white oak tanned leather will be found 50 per cent the cheapest in the end, and my mode of preparing a new belt is to soak it for about ten minutes in water; then let it dry 15 minutes; then brush it over two or three times with neatsfoot oil. When it is well dried, I put on the belt, and oil it once in two months in cold weather, and once a month in warm. P.

Troy, N. Y., Feb. 16, 1860.

Our correspondent is perfectly correct in regard to the superior results obtained from driving pulleys with the grain instead of the flesh side of the belt next to the pulley. It would naturally be supposed that the rough side would be the best to apply to the pulley; but experiment has adduced the fact that when the grain side of a belt is placed next to a pulley, it will drive about 34 per cent more than when the flesh side is placed next to it. In connection with this subject we may state that Mr. William Barbour, superintendent of the mechanical department of the Pacific Mills, at Lawrence, Mass., has sent us the following communication, which will undoubtedly be deemed valuable by many of our readers:—

MESSRS. EDITORS:—Herewith I send a table of the power, width and velocity of belts for driving any kind of machinery where applicable. Knowing there is, among machinists who have the charge and arrangement of machinery, a want of information on this subject, and having seen nothing in print for general information of this character, I present this; having made practical use of it several years with perfect satisfaction, I cheerfully recommend it to all who may at times be in want of reliable information with regard to belts, their width and power, &c. You will observe that the table takes in belts from one to six inches in width, and running up to a velocity of 4,000 feet per minute. I will, at another time, continue the table in four parts more, running up to a width of 30 inches with the above velocity; this width and speed being minimum and maximum of all belts worth of notice.

Velocity in feet per minute.	Inch. 1	Inches. 2	Inches. 3	Inches. 4	Inches. 5	Inches. 6
5	.4	.8	.13	.17	.22	.26
10	.8	.17	.27	.36	.45	.55
15	.13	.27	.41	.55	.68	.83
20	.17	.36	.55	.73	.92	.111
25	.22	.45	.68	.92	.115	.138
30	.27	.55	.83	.111	.138	.166
35	.32	.64	.96	.128	.162	.194
40	.36	.73	.111	.147	.184	.222
45	.41	.83	.128	.166	.208	.250
50	.45	.92	.138	.184	.231	.277
75	.68	.138	.208	.277	.347	.417
100	.92	.185	.277	.371	.463	.561
200	.184	.371	.556	.742	1.031	1.113
300	.277	.556	.835	1.113	1.392	1.671
400	.371	.742	1.113	1.485	1.896	2.227
500	.463	.927	1.392	1.856	2.321	2.795
600	.556	1.113	1.671	2.227	2.795	3.345
700	.649	1.298	1.948	2.598	3.248	3.898
800	.742	1.485	2.227	2.971	3.713	4.456
900	.835	1.671	2.506	3.332	4.177	5.013
1,000	.927	1.856	2.785	3.711	4.642	5.581
1,100	1.081	2.042	3.123	4.085	5.106	6.127
1,200	1.113	2.227	3.332	4.456	5.581	6.685
1,300	1.206	2.412	3.621	4.849	6.035	7.242
1,400	1.298	2.598	3.898	5.198	6.498	7.798
1,500	1.392	2.785	4.177	5.571	6.963	8.356
1,600	1.486	2.971	4.456	5.942	7.427	8.913
1,700	1.577	3.156	4.735	6.313	7.892	9.471
1,800	1.671	3.332	5.013	6.685	8.356	10.027
1,900	1.763	3.527	5.292	7.056	8.831	10.570
2,000	1.856	3.713	5.571	7.427	9.285	11.130
2,100	1.948	3.898	5.848	7.998	9.748	11.680
2,200	2.042	4.085	6.127	8.171	10.213	12.250
2,300	2.135	4.271	6.402	8.542	10.670	12.810
2,400	2.227	4.456	6.685	8.913	11.130	13.160
2,500	2.321	4.642	6.963	9.285	11.600	13,940
2,600	2.412	4.807	7.242	9,656	12,060	14.470
2,700	2.506	5.013	7.521	10.027	12.530	15.030
2,800	2.598	5.198	7.798	10.398	12.980	15.580
2,900	2.642	5.385	8.077	10.760	13.450	16,150
3,000	2.785	5.571	8.356	11.130	13.920	16.710
3,200	3.172	6.373	9.544	12.744	15.916	19.110
3,400	3.264	6,528	9.892	13.056	16.120	19.780
3,600	3.394	6.988	10.382	13.976	17.370	20.760
3,800	3.648	7.448	11.096	14.806	18.544	22.190
4,000	3.840	7,840	11.680	15.680	19.620	23.360

The sums in the columns beneath the figure 1, 2, 3, 4, 5, 6, (in the first horizontal line) indicate the horse-powers (in decimals) of belts of those widths, when running at the respective velocities stated in the first column. *Example.*—A 6-inch belt, running 2,200 revolutions per minute, gives 12¼ horse-power.

I would strongly recommend all belts above 12 inches in width to be made double, as they will carry 50 per cent more power, with less decay, if properly made.

W. B.

Lawrence, Mass., Feb. 20, 1860.

BURNING FLUID AND TENEMENT HOUSES.

MESSRS. EDITORS:—I have read your remarks on page 121 of the present volume of the SCIENTIFIC AMERICAN, about the destruction of the tenement house in Elm-street, also your recommendation of iron staircases for such houses. Now, considering the means by which the house was set on fire, namely, burning fluid, would it not be as well to insist on the houses being so well and strongly built that gunpowder might be exploded in the cellar without injury to the house; that being quite as innocent as burning fluid. Two gallons of burning fluid spilled on a staircase would burn any wooden tenement, however well constructed, and two kegs of powder exploded in the same place would not destroy the building more effectually.

I think that the coroner's jury should have censured the fluid first, and the builder of such houses second.

M. P.

New York, Feb. 22, 1860.

SAVING LIFE IN SHIPWRECK.

MESSRS. EDITORS:—In the case of apparatus for casting a line between a wrecked vessel and the shore, why is not the mortar placed upon the ship, instead of on shore? In nine cases in ten the ball with the rope attached may be cast upon the shore, while in nineteen cases out of twenty, the rope will not strike the ship, when cast from the shore. Anchor claws might be attached to the ball to facilitate its catching hold upon the shore. Ships ought to carry, each, a small mortar, with a supply of rope and ball.

A CAREFUL READER.

Fishkill Landing, N. Y., Feb. 14, 1860.

[It is customary for British vessels to carry the apparatus spoken of.—EDS.

FRANCE ON AMERICAN ASTRONOMERS.

A late number of the *Revue des Deux Mondes* contains a review from the pen of Mr. Auguste Laugel, on the Observatory of Cambridge, Mass., and the labors of the Professors Bond—father and son. The reviewer speaks in terms of unqualified praise of the labors of these *savans*, of the great extension which the science of astronomy has acquired in the United States, and of the tendency of the people to the support and encouragement of this particular field of science. He contradicts the generally received opinion in Europe that the people of the United States are only ambitious in the direction of material progress, and points with conclusiveness to the fact that we have more observatories already than France. The writer speaks in the highest terms of the works of Lieut. Maury, and then utters the fear that the vogue which this writer's popular writings on meteorology have attained may lead the people of the United States, naturally of a practical turn of mind, too much after meteorology, to the neglect of astronomy. The writer then mentions in the most honorable terms the labors of the other astronomers of the United States, and in speaking of the late work of Professor Pierce, of Harvard University, "Physical and Celestial Magnetism," characterizes it as a veritable astronomical encyclopædia, but regrets that he has mingled theological ideas with scientific calculations.

TRANSPARENT IVORY.—The process for making ivory transparent and flexible is simply an immersion in liquid phosphoric acid, and the change which it undergoes is owing to a partial neutralization of the basic phosphate of lime of which it principally consists. The ivory is cut in pieces not thicker than the twentieth part of an inch, and placed in phosphoric acid of a specific gravity of 1·131, until it has become transparent, when it is taken from the bath, washed in water and dried with a clean linen cloth. It becomes dry in the air without the application of heat, and softens again under warm water. *Druggists' Circular.*

THE sea serpent has been caught at Bermuda in the form of a huge gymetrus, 30 feet long. The haunts and habits of this tribe of fishes are but imperfectly known to marine geologists.

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MANUFACTURE AND USES OF STARCH.

A most valuable paper on this subject was recently read before the London "Society of Arts" by Dr. F. Grace Calvert, F. R. S.; and as the manufacture of starch is carried on very extensively in this country, we will present the substance of the paper for the benefit of all interested.

At the beginning of the present century, starch was only used for dressing linen in private houses; now it is employed for a great many purposes, and one single print-works in the city of Manchester alone uses no less than 300 tuns of it annually. It is a most important food for man, yet it is often associated in plants with acrid poisons. Starch is thus associated in the wild chestnut; and in the root of the manioc it is mixed with prussic acid. The natives of the West Indies have found that, by heating the roots of the manioc, the prussic acid is dispelled, and the starch retained in the form of tapioca. It is an interesting fact that, although the globules of starch vary in size from the 1,000th to the 300th part of an inch—as in the case of potato starch—still, they are all of the same composition when pure and dried at 220° Fah. All starches except inuline give a blue color with iodine, and, strange to say, this color disappears when starch and iodine are heated together in a solution, but returns when it becomes cool. This blue is very beautiful, and M. Payen, of Paris, has lately succeeded in rendering it permanent. This is done by mixing some starch with ammonia-oxyd of copper, and allowing them to remain in contact for several hours, when the excess of copper is washed away, and a green precipitate is left behind. This is now boiled in water, and a solution of iodine added, when a splendid purple precipitate is formed,

The globules of starch, when heated in water, swell and burst, and they are then found to be composed of successive concentric layers, which have different degrees of solubility. Starches absorb a great deal of moisture from the atmosphere; that which is made from potatoes, when kept in a damp place, generally contains from 25 to 45 per cent of water. It is an easy matter to find out when potato starch contains much or little moisture. Thus, by placing starch on an iron plate heated to 212° Fah., if it contains only 18 per cent of moisture it will move about quickly; but if it contains 35 per cent, it will agglomerate and form into hard lumps. On the continent of Europe, great quantities of potato starch are now manufactured into artificial tapioca; and many persons, while they suppose themselves to be enjoying a rich tapioca pudding, are feasting on the product of the potato.

M. Niepce de St. Victor, of Paris, has recently made the curious observation, that when paper is saturated with starch and exposed to the rays of the sun, the starch is slowly converted into sugar. Diastaste, which exists in all grains—and especially in malt—possesses the same property in a high degree, particularly at a temperature of 150° Fah. This temperature should never be exceeded by brewers with malt in their mash tubs, as it annihilates the converting power of the diastaste, and causes serious loss.

One of the greatest triumphs of chemistry applied to physiology has been the discovery of diastaste in the saliva and pancreatic juice in the human system, by which the starch which is taken as food is converted into an isomeric substance called glycogene, which is stored by the liver, and is then converted (according to the requirements of vitality) into sugar, and then carried by the circulation of the blood into the capillaries, where it is converted into water and carbonic acid, producing the heat necessary for the maintenance of life. Chemists have also discovered the presence of starch in the skeletons of the *invertebrata*, such as the *crustacea* and several insects.

Starch presents a great similarity of composition to the fibers of plants, such as flax and cotton; and when it is treated with concentrated nitric acid, it is converted into a fulminating substance called "xylodine," which is similar in its nature to gun cotton.

Sago starch is made from a tree which grows to about 30 feet in hight. It is cut down, then cleft longitudinally, and its pith washed through a sieve. The water carries through the starch, which falls down in a deposit in shallow wooden vessels; then it is collected in lumps and dried in the sun, after which it is reduced to a coarse powder, when intended for exportation.

The manioc root, from which tapioca starch is made, is first grated into a pulp with water, and in this state submitted to a heavy pressure, which squeezes out a large quantity of prussic acid—a deadly poison. The pressed pulp is now placed on warm iron plates, and dried into what are called "cassava cakes," which are used for common food by the people. When intended for tapioca, the pulp of the manioc is not pressed; it is simply heated on hot iron plates, by which it is reduced into quite a soluble condition, and is formed into small lumps. The heat drives off the prussic acid as effectually as pressure.

Inuline starch, which is made from the roots of dahlias, has not yet been applied to arts or manufactures; but it deserves attention, as when boiled in water it does not form a gelatinous mass or coating like other starches. Dr. Calvert does not state to what purposes it would be most applicable; but, owing to the difficulty of cultivating these roots in England, as well as in the northern sections of this country, cheap starch could not be made from them. In California, however, where they are very prolific, they can be cultivated as economically as potatoes, and inuline starch may be made from them at no great expense.

The starch in wheat is associated with gluten which is the azotized substance that determines the nutritive value of flour. Until recently this has been considered a waste product in starch factories, but it has now been applied to calico-printing in Great Britain, as it has been discovered that under certain circumstances gluten is soluble in a weak alkali, and it is used as a substitute for albumen in fixing the beautiful French purple—mauve color—on printed muslins. The two principle substances of wheat—starch and gluten—are used in calico printing for mixing with the colors, the one as a fixing agent, and the other as a substitute for natural gums.

The usual mode of obtaining wheat starch is to place flour, or crushed wheat in large tubs or vats, containing a suitable amount of water, then allow it to enter into fermentation and continue this for several weeks according to the temperature of the atmosphere. In the winter season, this is carried on in heated apartments, where the fermentation continues without interruption. The putrefaction of the gluten of the wheat generates a very offensive odor in starch factories, and the fermentation produces a foul acid called *sour water*. This sour water contains alcohol, acetate of ammonia, acetic and lactic acids, bisulphate of lime, and decomposed gluten. The fermentation which first occurs in making starch is the vinous, which is carried on at the expense of the sugar and a certain portion of the starch. By this action carbonic acid, and some alcohol are formed, the latter remains in the liquor, the former passes off. The alcohol is transformed under the influence of the oxygen of the air and the gluten, into acetic acid, and it is by this acid conjointly with the lactic acid that the complete separation of the starch and gluten in wheat is effected in the vats. The ammonia comes from the decomposition of the gluten; the lactic acid is a secondary product arising from the starch. But the fermentation and the acids are not sufficient to remove or destroy the whole of the gluten which usually forms a layer on the top of the starch called *slimes* and *flummery*. This is employed in England for making pastes for calico printing; in America for feeding pigs The slimes are removed from the starch by washing and passing the liquid through seives, but formerly the starch was simply allowed to gradually settle to the bottom of wooden boxes. In present American practice, the starch water taken from the vats is allowed to flow slowly down a set of shallow wooden pans, like gold-washers' raffles, which have strips of wood nailed across their bottoms, forming a sort of stair. In passing over these the starch is deposited more rapidly and a greater quantity of it is also obtained, and what is perhaps more important, the different qualities are separated by the operation.

The starch is now lifted in seives, or drained by being placed in boxes having cloth bottoms. After this it is broken in masses of about six cubic inches each, wrapped in paper and placed into heated rooms, where these masses split up into the thousands of irregular pieces well known to every person. All kinds of starch do not assume such forms; that made from potato and such bulbous roots do not.

[To be continued.]

A COLUMN OF VARIETIES.

If apple trees are set 2 rods apart, an acre will contain just 40 of them; but if they are set only 30 feet apart, they will stand at the rate of 48.4 to the acre. An acre will contain 160 peach trees, a rod apart, and 193.6 if set 15 feet apart. If an orchard is set with apple trees, 30 feet apart, with peach trees between the rows, both ways, there will be 48 apple trees and 147 peach trees in an acre.....In the engineer's report to the trustees of the Philadelphia gas works, it is stated that the largest quantity of gas made from each pound of coal, for any full day's work, was 4.74 feet. This would give 9,480 feet to the tun of 2,000 pounds, which, at $2.50, the price of gas in New York, would amount to $23.70 cents. One retort will produce 7,000 cubic feet of gas per day.....The *Irish Country Gentleman's Newspaper* states that about one-third of Ireland is arable, one-third is pasture, and the remaining third consists of bogs and irreclaimable mountain wastes.....In the English agricultural papers are advertisements of a great company in London, who manufacture manure from blood. They state that the number of beasts, sheep, horses, calves, and pigs slaughtered in London, in 1856, was 821,705; that the yield of blood from these was 802,000 gallons, of which Odams' Blood Manure Company received 771,000 gallons.....Mr. Fairbairn has calculated that the greatest clear span at which an iron tubular bridge would support its own weight would be between 1,800 and 2,000 feet..... The Westminster bell, after being cast, required a fortnight for cooling .....£4,000,000 in value of guano are estimated to be used annually in Great Britain.....The reflection of the sun's rays in a mirror has been distinguished at a distance of twelve miles.....Watt's engines, as left by him in Cornwall, consumed 10 lbs. of coal per horse-power, per hour.....Professor Faraday has stated that an oxy-hydrogen light, displayed on the Scotch highlands, was distinguished at the distance of upwards of 90 miles..... With a given amount of brake power a train running at 40 miles per hour will run four times farther before being stopped, than it will at 20 miles an hour.....Mr. Fairbairn's experiments show that a train moving at 20 miles an hour on a level, may be stopped, by means of continuous brakes, in a distance of 72 feet, and at 60 miles an hour, in a distance of 636 feet.....If a water joint is made between an iron and a brass surface, a galvanic action is set up, which frequently eats the iron surface full of holes. If iron is cast upon brass, as it may be, no action of this kind ensues.....By recent returns it appears that the average duty of the pumping engines in Cornwall, England, has fallen off from 53,000,000 lbs. raised 1 foot by a bushel (94 lbs.) of coal—the average result attained twenty years ago—to 43,800,000 attained by the same fuel in 1858.....Mr. Hugh Taylor, M. P., has stated that some years ago he employed eighteen sailing colliers in the London coal trade. The aggregate cargoes of these vessels averaged 54,000 tuns annually. The same amount of tunnage is now carried by two steam colliers of 800 tuns each.....The total number of steam vessels owned and registered in Great Britain on the 1st of January, 1859, was 1,854; including the colonies, the number was 2,239, of a tunnage of 488,415. Of the 1,854 British steamers, 992 are of iron, 861 of wood, and 1, the *Rainbow*, of steel. 1,263 are propelled by paddles, 589 by screws, and one, the *Great Eastern*, by combined screw and paddles.....The total tunnage of the United States amounted, in 1858, to 5,049,807 tuns, of which 729,390 tuns consisted of steamers..... The first iron steamboat built on the Thames was the *Daylight*, constructed by Ditchburn and Mare, of Rotherhithe, in 1838. At the time Mr. Ditchburn undertook to substitute iron for wood in the construction of steam vessels, he was regarded by the profession as laboring under a mental hallucination.....A 600-tun wooden ship, after being three years afloat, will absorb, by soakage, from forty to sixty tuns of water, increasing the draft from six to nine inches, thereby increasing the positive resistance and reducing the speed.....Water-tube boilers were made as early as 1836, by Mr Spiller, and applied by him to the London and Westminster Company's boats.....The highest proportion of power to tunnage, in a large steam vessel is furnished by the *La Plata*, of 2,404 tuns and 1,000 horse-power.....A yacht, of which the hull was constructed of copper, was made about 100 years ago, for the grandfather of the present Marquis of Anglesea.

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IMPROVED AUTOMATIC SKATE

The skate here illustrated is fastened to the sole of the boot or shoe, has a creeper or ice-check which is secured in a similar manner, and is an adjustable combination of the grooved or sharp with the flat or smooth-faced runner, presenting at once the most important improvements in a simple combination, and making it altogether a most complete invention.

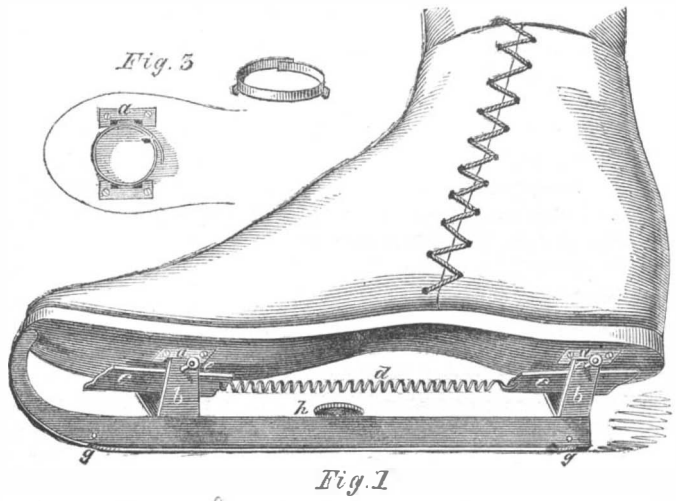
The metal plates, *a a a a*, are screwed to the sole of the boot, their beveled edges being inside or facing each other, and the surfaces made flush by letting them into the sole. The elastic struts or braces, *b b b b*, are cast in the runner or firmly fastened thereto, each pair diverging, so that, when the wearer stands upon the skate, their ends are spread apart and pressed forcibly under the beveled plates, forming a dovetail fastening. The wedges, *c c*, are drawn towards each other by the spiral spring, *d*, at the same time that the struts are forced apart, which are thus prevented from springing back to their original position when the foot is lifted from the ice. The rods, *e e*, serve to keep the wedges in the proper position. To remove the skate, it is evident that the wedges have only to be drawn back so as to permit the struts to spring towards each other, when the skate drops off.

The creeper is an elastic ring with a sharp edge, having lugs or projections at the upper edge and on opposite sides, which fit the inclined edges of the plates, *b b*, and may be attached to the boot at the heel or ball of the foot by springing the lugs towards each other, and is removed by a similar operation.

The runner has a deep furrow, into which the bar, *f*, is inserted and secured by pins, *g g*, at the ends. The thumbscrew, *h*, in the runner is used to regulate the distance which the bar may project. Thus, by permitting the smooth surface of the bar to project slightly beyond the sharp edges of the runner, a very keen lateral hold upon the ice is attained, while the smooth bar affords the most perfect surface to slide upon. Any degree of adhesion may be obtained in this manner, according to the nature of the skating.

It is said that remarkable precision and celerity of movement are attainable in using this skate, and that great comfort and sense of security result from this method of fastening. Indeed, it is so much like magic and so nearly automatic that it holds with a firmness exactly proportionate to the weight of the wearer; and is automatic in its action, fastening itself by simply stepping upon it.

A patent for this invention was issued May 3, 1859, and parties desiring to obtain rights or further information should address the inventor, Uriel Josephs, Quincy, Mass.

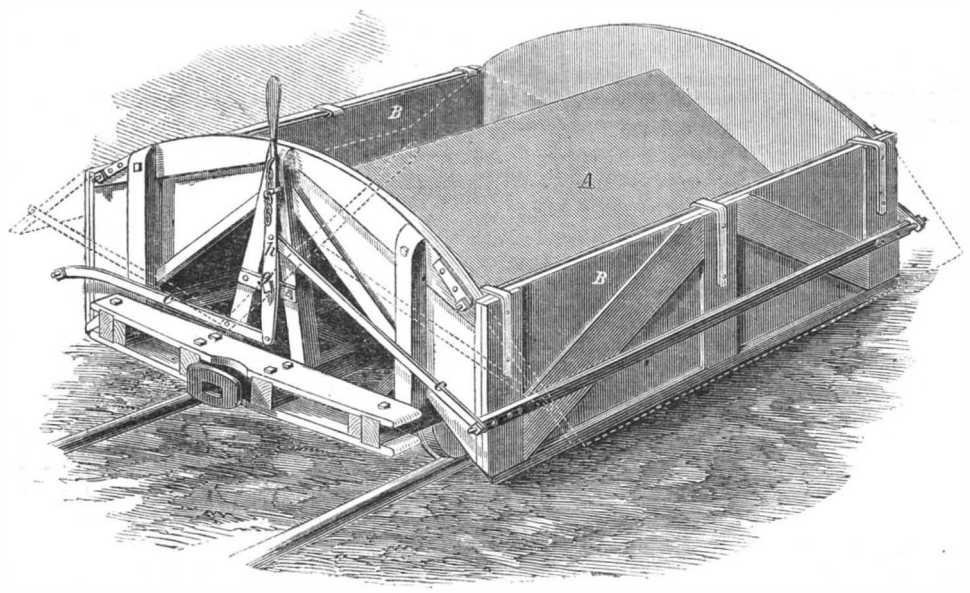


JOSEPHS' AUTOMATIC SKATE.

DURABILITY OF CAR WHEELS.—In the report of R. A. Wilder, Engineer and Superintendent of the Mine Hill and Schuylkill Haven Railroad, he says:—"The total number of cars hauled both ways over the road during the year is 729,186, and out of this great number moved, only 151 have been thrown from the track and injured so as to require the aid of a wrecking engine to bring them in. Some of them were badly broken, while others were but slightly injured. The average cost of repairing them has not been very heavy. Great care has been used by the employees of the company in handling the cars, and in nearly every instance the accidents have been traced to causes independent of the agency of the crews. The plate wheel has been the principal cause of damage; every accident resulting in serious loss has been caused by the breakage of plate wheels in descending steep grades. Where the trains must be regulated by the constant application of the brakes, in order to prevent their too rapid descent, these wheels cannot be used with safety. The safest and most durable wheel for all kinds of service is one formed with spokes, and having a divided hub secured by wrought iron bands. I have known this kind of wheel to be subjected to the severest tests without breaking where plate and spoke wheels with solid hubs would be sure to give way."

IMPROVED GRAVEL CAR.

The accompanying cut represents an improved dirt car used in the construction and repair of railroads, the peculiarity of which consists in the arrangement for discharging the load.



HENDRY'S IMPROVED GRAVEL CAR.

The bottom, A, of the car is made sloping from the middle downward to both sides, and the sides, B B, are hung on hinges at the top. The sides are opened and closed by means of the rods, *c c*, and lever, *h*, the full black lines showing the position of the parts when the sides are closed, and the dotted lines when they are opened. When the lever is upright, it is held in place by the pin, *i*, and when it is turned down to open the sides for discharging the load, it passes a little beyond the line of the levers, so that the strain of these keeps it in position. The sloping bottom extends on each side, a few inches past the sides of the car, so that the gravel or earth may be shot clear of the wheels.

This car is particularly adapted to filling embankments, being discharged, as will be seen, with the greatest possible facility.

The patent for this invention was obtained Dec. 13, 1859, through the Scientific American Patent Agency, and persons desiring further information in relation to it will please address Thos. C. Hendry & Co., Conyers, Ga.

AMERICAN BASKET WILLOW.

A great amount of willow-work is manufactured and sold in our country, but the willows from which it is made have been chiefly imported from Europe. This should not be, as they grow well in any climate, and they may be cultivated on wet soils near running streams, and profitable crops obtained annually from soils otherwise worthless. We are pleased to learn that considerable attention has been lately devoted to the cultivation of the willow, and Col. Colt, of Hartford, Conn.—the noted inventor of the repeating fire-arms which bear his name—has showed an example worthy of copying by all who have land similarly situated. His farm is on the Connecticut river bottom, about a mile from the city of Hartford, and is inclosed by a heavy dyke, to prevent the overflow of the river. This dyke is protected by thick-setrows of willow. The crop of the past season amounted to forty tuns. Offers were made by dealers in New York, for the purchase of the whole of it; but Colonel Colt, concluding to add to his other manufacture that of willow-ware, is about erecting buildings for the purpose. Besides the willow grown upon the dykes, he has seventeen acres of land established in this crop, and in the Spring will add fifty more, and will give employment to from eighty to one hundred men in its manufacture. For coarse baskets, the unpeeled willow is superior to any other material; while the finer portions of the crop can be peeled and wrought into baskets of a better quality. The increased culture of fruit for transportation by railroad requires an immense number of baskets, and this demand will continue to increase as this important branch of horticulture increases with the demands of the population in our cities.

PROTECTING YOUNG TREES WITH BLOOD.—With regard to the protection of young trees against the attacks of rabbits, mice, and other animals obnoxious to the vitality of vegetation, a Missourian correspondent (Dr. J. Dinkley) says:—"I will give you a much better remedy than any previously proposed. Rub the trees, from the ground upward to about 18 inches, with a piece of raw bloody meat—liver is the most convenient thing; or blood may be put on with a brush. If this be done late in the Fall or beginning of winter, no animal will touch the bark during that season. I have tried this plan for *thirty years*, and have never known it to fail. Let horticulturists try it."

On the Western Railway of France there is, in addition to the engine-driver and fireman, an inspector who rides upon the engine, and who attends, as far as possible, to the general observance of signals or accidents made from or happening to the train.

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VOL. II., NO. 10.....[NEW SERIES.]....*Fifteenth Year.*

NEW YORK, SATURDAY, MARCH 3, 1860.

IMPROVEMENTS IN PAPERMAKING.

N the manufacture of paper, every improvement, however small, is of consequence in the community, because this material is so extensively employed in literature to convey information and communicate thought. A new material applied to its manufacture, or an improvement in the processes, whereby its cost is reduced, affects the welfare of all, as it is the great agent which conveys food to the general and individual mind. Every plant of a fibrous character is capable of being converted into paper, but the processes necessary for reducing most of them into proper "stock" have hitherto been so inefficient as to preclude all competition with linen and cotton rags, especially for the finer qualities of paper. There are many paper materials which can be obtained much cheaper than rags, and much money has been expended in operating with straw, grass, weeds, shavings, and almost every conceivable vegetable fiber, but doubtful success appears to have attended the experiments made with most of them. White paper has been made from common straw, but it was so hard and brittle, and contained so many specks, that it could not be well employed for printing purposes. With a large admixture of cotton pulp, we know it has been employed in some instances for daily papers, but the great object has been to remove all its defects, so as to secure a perfect white and fibrous straw paper pulp. This, we think, has been to a great extent accomplished by simple processes now practiced by Messrs. Howland & Palser, paper manufacturers, of Fort Edward, N. Y., on which they have recently obtained patents. We find an article on this subject by Professor Poulton, in a late number of the *Fort Edward Institute Monthly*, which states that the straw paper made by this company is of a very superior character for printing and writing, and that the *New York Ledger* and *Sun* are now printed upon it. We know something about this paper, and the improved processes by which it is manufactured from straw, and can add our word of testimony to its good qualities. Hitherto all the processes employed to reduce straw to a proper pulp resembling that of cotton rags did not embrace the complete removal of the bitumen; hence it was almost impossible to bleach the raw material, while the paper made from it could not be otherwise than hard and harsh. By the new process the straw is submitted to a much higher temperature in close vessels and in alkaline solutions than had been done formerly, and by this means all the natural bitumen and glutinous impurities are removed, and a very pure fiber obtained. The other operations are similar to those in common use. The paper produced from straw by this mode of manufacture is of good color, and of fair quality for printing.

As paper is the greatest item of expense in the publication of books and periodicals which have a large circulation, every improvement in its manufacture is of great interest to the public, as it tends to furnish cheaper literature for the millions. *Apropos* to this, the London *News* (of the 7th of January) states that a new method of bleaching paper pulp has been discovered by M. F. Didot, of France, which consists in causing carbonic acid gas to be employed in conjunction with chlorine, and the process is thus described in the *Repertoire de Chemie:*—"While the chloride of lime is in contact with the fiber to be bleached, a current of carbonic acid proceeding from the combustion of charcoal is introduced in a highly divided state into the midst of the liquid. The gas uniting with the lime, the hypochlorous acid is set at liberty, and acts much more energetically as a decolorizer than the hypochlorite, The process is so simple that wonder has been excited that it was not invented sooner."

We "wonder" that any "wonder" has been excited by this alleged new discovery. By the use of sulphuric acid, the same results are secured in a more simple and economical manner, which is the old *discharge* process, so well known to calico-printers.

THE BUFFALO BIG SHIP.

We always like to say a word in favor of a new project, when it is based upon reason and science; and the more lofty and grand the design of the projector, the more we admire his genius and endeavor to encourage his efforts. On the other hand, when a great scheme founded upon erroneous scientific data, is brought before the public, we endeavor to point out its futile character, not only as a useful warning, but that its subsequent failure (as fail it must) may not be laid to the blame of science. In the first volume of the new series of the SCIENTIFIC AMERICAN—on page 305 and 352—we gave a brief account of, and expressed opinions regarding, the great steamship projected by Mr. R. Germain, of Buffalo, N. Y., by the side of which the *Great Eastern* was to be like a minnow to a whale, and about which the people of that city had been so much excited by public meetings and lectures. The designer of this great ship proposes that it shall be, not hundreds, but thousands of feet in length, and that by his calculations it may be made to run at the rate of about one hundred miles per hour (far surpassing the velocity of the railroad train) and that merchandize and passengers may be carried at much less expense by it than by common steamers, or even the railroad. We pointed out (on page 352) that the calculations of Mr. Germain were not based upon correct scientific data; that while he was to achieve so much with so little, by obtaining a double speed with a quadruple power, a *cube* power was required to secure such results; and that his project was therefore in a manner visionary. Our opinions so expressed have been endorsed by a respectable and able committee of the citizens of Buffalo, composed of Messrs. George Hadley, A. T. Chester, Chas. E. West, David Bell, William Allen, William Moses, C. D. Delany, and F. N. Jones, who were appointed to examine the whole scheme and make a report of their investigations. This they have done. A large meeting was held on Feb. 11th, in Buffalo, presided over by Ex-President Fillmore; and Professor C. E. West read the report of the committee, which we would give *in extenso*, if space permitted, because it is so cautiously worded in language, and so sound in the tone. We however, can only give the leading points. These gentlemen discussed all the questions—theoretical and practical—relating to the mathematics, machinery and building of such a vessel, and they say that they have been "embarrassed in considering the conflicting statement of authors; some maintaining that the mechanical power necessary to overcome the resistence of a body moving in a liquid increases as the square of the velocity, while others are equally explicit, that it increases as the cube of the velocity. A solution of this problem is of the utmost importance to the practical engineer, for if the motive power be as the *cube* of the velocity (*which is the conclusion of the committee*), it is apparent that the very high rates of speed contemplated by Mr. Germain must be attended with an enormous expenditure of mechanical force."

According to this opinion they consider the scheme to be visionary; and they clinch this idea by stating, in another part of the report, that "a boat so built may be made to attain a speed of 30 or 35 miles per hour"—quite a reduction from the hundred-mile velocity of its projector. Notwithstanding the unfavorable report on this steamer, so contrary to the opinions of Mr. Germain (who was present at the meeting, and expressed himself surprised), the people of Buffalo have taken measures to organize a company for the construction of such a steamer. The idea which seems to possess them is that, as the railroads have taken away much of the lake trade of their city, this steamer will certainly bring it back by its great speed and cheap carrying capacity. We advise them to be cautious; though we have not a word to say against their making an experimental boat, but we suggest that, whatsoever is new in the form of the vessel or in the arrangement of its machinery, these can as well be tested, comparatively, on a boat 100 feet in length as on one 4,000 feet long. We are well aware that large vessels of the common form are more economical of power than small vessels, because they possess, proportionally, less resisting surface; but this has nothing to do with the testing of a new vessel like that of Mr. Germain's. Its merits can be as fairly tested and compared, on a small as a large scale, with another common steamer of the same capacity in all other respects.

ENGLAND ON OUR NAVAL ARCHITECTURE.

Our venerable cotemporary, the London *Mechanics' Magazine*, quotes the brief report of Senator Murphy's lecture, published on page 26 of the present volume o. the SCIENTIFIC AMERICAN and with a very self-satisfied air in regard to its own intrinsic capacity for treating such subjects, it says: "We cannot fail to observe the thing which passes for scientific naval architecture across the Atlantic." Such self-congratulation may be all very fine in London, but it is neither sensible nor just towards the naval architects of America. That which passes for scientific naval architecture in New York, we assert, is as sound as that which passes current in the British metropolis or any other part of the world; but the lecture of Mr. Murphy was given before a mixed audience and for the entertainment of an hour, not before a select audience of naval architects and as a scientific disquisition on the art. None of Senator Murphy's conclusions have been criticised, and none of his errors (if any) have been pointed out. We must tell our cotemporary that "the *thing* which passes for scientific naval architecture" on both sides of the Atlantic, is not words but deeds; and we believe that our shipbuilders have rather the advantage on this head. The swiftest ship in the English service, at present, is the *Lightning*—an American-built vessel; and we have "several others of the same sort left."

TESTIMONIAL LETTER FROM EX-COMMISSIONER BISHOP.

We have much pleasure in presenting herewith a flattering testimonial letter from Hon. W. D. Bishop, late Commissioner of Patents. His opportunities of judging correctly in such matters, none will presume to question:—

MESSRS. MUNN & CO.—Gentlemen: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

Bridgeport, Conn., Feb. 22, 1860.

APPLICATIONS FOR THE EXTENSION OF PATENTS.

Magnetic Printing Telegraph.—Royal E. House, of Binghamton, N. Y., has applied for the extension of the patent granted to him on the 18th of April, 1846, for an improvement in magnetic printing telegraphs. The petition is to be heard at the Patent Office on the 11th of April next. The testimony closes on the 27th of March.

Block Tin Spoons.—Joel Hall (2d), of Wallingford, Conn., has applied for the extension of the patent granted to him on the 25th of April 1846, for an improvement in the manufacture of block tin spoons. The petition is to be heard at the Patent Office on the 23d of April next. The testimony closes on the 9th of April.

COAL OIL IN THE CARS.—The Naugatuck Railroad Company, upon the recommendation of Conductor Beach, have introduced coal oil as an illuminator of the interior of their passenger cars. The light is more brilliant than that produced by the car gas apparatus. Conductor Beach has contrived a simple plan of making the flame of the coal oil lamps burn with as much steadiness when the cars are in motion as common oil or any other illuminator.

A SMALL ERROR.—In our article last week upon "American Naval Architecture," in the third line from the bottom of the last column on page 131, the diameter of a pipe is given as being "small" at six feet. Now it is evident that a pipe six feet in diameter is no juvenile, but a full-grown subject. It would be nearer the truth, if the word *smoke* were substituted for "small."

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WEEKLY SUMMARY OF INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page:—

SUGAR SKIMMERS.

The object of this invention is to lighten the labor of skimming the sirup in the kettles or pans in the manufacture of sugar. The skimmer ordinarily used, consisting of a shallow perforated bowl attached to a pole, is heavy and can only be used by the strongest hand on the plantation; for being perforated, it does not float on the sirup, and its entire weight has to be supported by the operator, not only in transferring the skimmings from one pan to another, but in letting the sirup drain from the perforations; and in the act of skimming it derives but little support from the sirup. This invention consists in furnishing the skimmer with a float which resting on the sirup will support it during the skimming operation and also while any sirup that may be taken up with the skimmings drains through the perforations back into the kettle or pan. The credit of this contrivance is due to John M. Jones, of New Orleans, La.

COTTON PRESS.

The object of this invention is to obtain a simple, powerful and economical press for the use of planters and farmers; one that may be operated by any convenient power, and be capable of very general application, in fact, susceptible of being adapted for use in all cases where any of the known presses may be employed. The invention consists in the use of rack bars, a lever provided with a suitable fulcrum, and pawls or hooks, arranged and combined in a novel way for the purpose of giving the desired pressure. The invention further consists in a peculiar arrangement of the press by a connexion with the levers and rack bars aforesaid, whereby the cotton may not only be compressed with facility, but also readily removed from the press-box when compressed and bound in bale form. The inventor of this improvement is Edward C. Betts, of Huntsville, Ala.

OYSTER DREDGE.

This invention is an improvement in machines for dredging and gathering oysters from the beds of rivers where oyster tongs cannot be used to advantage on account of the depth of water, or from various circumstances; it consists in supporting and hinging a peculiar shaped rake upon sled runners of sufficient width to prevent their sinking in the sand; and in connection with said rake upon runners, it further consists in arranging in a suitable manner upon the arms of the dredge a deflecting board, which is acted upon by the water so as to force the rake down and keep it upon the bottom of the river. The invention also consists in a peculiar construction of the rake, whereby great strength is obtained, at the same time the head of the rake will not form a barrier to the machine. This improvement was designed by W. L. Force, of Keyport, N. J.

IMPROVEMENT IN TANNING.

The improvement in tanning hides and skins of all descriptions, just patented by Charles L. Robinson, of Waukesha, Wis., consists in the employment of terra-japonica—purified by a very simple process—in combination with certain salts of magnesia and potassa, whereby both upper and sole leather of superior quality is produced. By this process tanning operations may be conducted altogether independently of the oak and hemlock barks of our forests, in any situation where plenty of water can be obtained.

OUR WHALING OPERATIONS.

Our hardy seamen from New Bedford and Nantucket have become as familiar with the Pacific ocean as with the waters of Narragansett bay. In pursuit of their dangerous avocation they generally remain several years away from home, but come in occasionally to refit at some of the Pacific islands. The Sandwich Islands have become completely Americanized, and the port of Honolulu is almost as much Yankee in its population as New London, in Connecticut. The last year's whale-fishing operations, according to reports from Honolulu, were not favorable. The number of American whalers which had entered Hawaian ports, in 1859, was 176, of which 5 were sperm whalers. It is stated that the whales are annually decreasing in number and size, and that for the future the number of ships engaged in the business will be very considerably reduced. The whaling fleet in the Pacific for 1860, number 172 ships. The total catch in 1859 was 1,450 barrels of of sperm, 102,980 barrels of common whale oil, and 1,312,000 pounds of bone. Various substitutes are now used for whalebone, such as hard india-rubber and dyed canes, so that the decrease in this article is not so much felt.

ACTION OF FROST UPON SOILS.—The soluble part of the soil is the inorganic food of the plants. Rain water cannot come in contact with the soil, or even with a gravel heap without dissolving some of it. Expose almost any stone, or handful of gravel, washed clean, to the action of a quart or so of rain water several days, and upon evaporating the water, it will be seen from the residue left that a portion has been dissolved. Now let these same stones be exposed, covered or partly covered with water, in a saucer, to the action of frost, setting them out of doors for two or three cold nights, taking care that they thaw by day. Pour off the water, rinsing with fresh, and evaporate as above, and it will be seen that a very much larger quantity has come into solution. The reason is, that all stones being somewhat porous, by the action of the frost their outer portion is broken up, scaled and fissured, and a vastly greater surface is exposed to the action of the water, even though this fissuring is not visible to the eye. When land is exposed to alternate freezing and thawing, the same effect must take place.

MACHINE BANDS.—M. J. Haines, of England, has taken out a patent for making bands for driving machinery. The improvement consists in cutting the hides of leather spirally into strips, then straightening them while they are in a moist state, after which they are sewn side by side, longitudinally, to form the driving band.

Literary Notices.

THE FARMERS' JOURNAL. Published by De Montigny & Co., Montreal.

The success of this ably-edited journal, now in its XIIth volume, is a striking proof of the intelligence and enterprise of the farmers of Canada.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION. Published at Boston by the Association.

We acknowledge the receipt, from the president of this association of druggists—Samuel M. Colcord, Esq.—of the account of their proceedings at their eighth annual meeting. We are pleased to see that their efforts are principally directed to rooting out the practices of quackery and adulterating from this important and responsible trade. We hope they will acquire more boldness in dealing with the monstrous crime of adulterating drugs.

THE AMERICAN ALMANAC FOR 1860. Crosby, Nichols & Co., publishers, Boston.

This old-established and sterling publication makes its appearance with its accustomed punctuality. It contains the usual mass of varied and reliable information; the names of the several officers of the United States government, and of the separate States, with their salaries; lists of officers of the army and navy, with their pay; the same information in regard to the judiciary and the intercourse with foreign nations; tables of the exports, imports, revenue and public debt of the country and of the several States; similar information in regard to the countries of Europe, with the names and ages of the living rulers of the world; record of events for the past year; American and foreign obituary; astronomical and meteorological tables; besides a long list of other subjects, making it an invaluable work of reference for every family in the land.

MANUAL OF PHONOGRAPHY. By Benn Pitman, Phonographic Institute, Cincinnati, Ohio.

We have recently had inquiries as to where a work on phonography could be obtained, and we are now able to answer. This work is an elegant little volume, of the size of a large pocket-book, and may be presumed to contain a complete account of the subject. The author says: "All the phonographic exercises, title page, &c., are produced by a new process—another application of electrotyping, that wonderful art of molding metals without heat. This new process of engraving has cost me four years of constant experiment. The labor which heretofore has been expended in drawing a design on wood, previous to cutting, suffices, by this process, to complete it in imperishable copper."

EDINBURGH REVIEW. Published by Leonard Scott & Co., No. 54 Gold-street, this city.

The present number of this most able periodical commences a new volume, and it offers an inducement to read its pages by ten essays which it contains, each of which is marked with unusual ability. Two of these have attracted our special attention; one on the "Mortality of Trades and Professions," and the other on the "Coal Fields of North America and Great Britain." The foreign reviews published by the above company contain the ablest essays which are now written in the English language.

THE NEW YORK TEACHER. James Cruikshank, publisher, Albany, N. Y.

This standard publication is in its IXth volume. Every teacher, and every parent who has a child at school, would find a subscription to some good work on education money well invested. Besides the information obtained, it promotes an intelligent interest in this all-important subject.

THE DENTAL REGISTER OF THE WEST. J. T. Toland, publisher and proprietor, Cincinnati, Ohio.

We have received from Messrs. Rudd & Carlton, No. 130 Grand-street, this city, the following books just issued by them:—"Answer to Hugh Miller and Theoretic Geologists;" by Thomas A. Davis. "The Habits of Good Society;" a hand-book for ladies and gentlemen, instructing them how to prepare for proper behavior in society; printed from a London edition. "Edgar Poe and his Critics;" a beautifully printed volume of 80 pages; by Sarah Helen Whitman. It is a pleasant defense of the unfortunate poet.

COVERING ZINC WITH BRASS OR COPPER.—To give zinc a coat of copper or brass for the purpose of a subsequent silvering or gilding, the following solutions are used:—For copper alone, a solution of vitriol, saturated at the common temperature, is mixed with a solution of cyanide of potassium, adding as much of the latter as is necessary to dissolve the precipitate thrown down at first. The prussic acid disengaged during this operation must be carried off by a draught or flue. When the mixture is clear, one-tenth or one-fifth of its volume of *aqua ammonia* is added, and diluted with water to density of 8° Beaume. For brass, blue and white vitiol are used in equal proportion, and prepared as before. Two parts of sulphate of zinc and one of sulphate of copper give a bright brass coating. Previous to their dipping, the articles of zinc are rubbed off thoroughly with finely-powdered pumice-stone and rinsed in water, after which manipulation they are placed in a bath and remain there for 24 hours. After that time they are again rinsed in water and simply wiped off. The copper or brass covering has a very bright look, as if polished, and adheres perfectly. The thickness of the coat may be increased afterwards by the aid of a battery.—*Le Technologiste.*

FOREIGN NEWS AND MARKETS.

A paper was recently read before the Institution of Mechanical Engineers—Birmingham, (Eng.)—on superheated steam, by J. N. Ryder, of London. By the use of superheated steam apparatus, the quantity of water required for boilers has been reduced, together with a considerable saving of coal and power. Two steamboats with superheating apparatus have been running on the Thames for several months, and a saving of 30 per cent of fuel has been secured in them, with a gain in the number of revolutions of the engines, and the cylinders remained bright and in good order. The steam was superheated from 212° to 400° Fah., and satisfactory have been the results, that a number of other boats are about adopting the same arrangements. No danger need be apprehended from superheated steam any more than common steam. The only advantage, and it is a great one, which is secured by the superheating method, is the conversion into true steam of all the molecules of water which generally ascend with common steam, rendering it very moist and liable to sudden condensation on the side of the cylinder.

The large submarine cables which have been laid down in Europe, as well as a new one connecting Australia with Tasmania, are said to be operating badly. The Channel Island cable, the one in the Mediterranean between Malta and Cagliari, and the one between England and the Isle of Man, are all failures to a certain extent. Some have attributed this to defective insulation in the first place; while others affirm that it is all owing to the rocky bottom on which they were laid, and the under currents to which they have been subjected. It is asserted that every submarine cable laid down in a muddy bottom has been successful, while those laid in shallow sea and on hard rocky bottoms, without being made enormously thick to prevent abrasion, have all failed. In all likelihood, the truth lies between the two opinions.

There are several voluntary associations of manufacturers and others in England, who use steam power, the objects of which are the employment of competent inspectors to examine their boilers regularly, report their condition and management, and give advice. These are noble institutions, and exhibit an amount of sound economy and good sense on the part of Englishmen which deserves to be copied in every part of the world. Every member pays so much into the treasury, and his boilers are regularly examined; and if a gage is defective, a valve out of order, a stay bent, or anything the matter to jeopardize the safety of his boiler or factory, he knows it, and provides a remedy. At a late meeting of the Huddersfield Boiler Association, the case of a boiler explosion was reported as having been the result of a defective arrangement exactly like that on the boiler which recently exploded at the hat manufactory in Brooklyn. There were four boilers coupled together with a stop-valve between the boiler and the safety-valve. This is a most objectionable and dangerous arrangement. The inspector of the Huddersfield Boiler Association condemns the practice of relying entirely upon self-acting floats to determine the level of water in boilers; he says they may be used as safety adjuncts in connection with good glass water gages, not otherwise.

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The Manchester Cotton Supply Association have lately received a great number of samples of cotton from India, and one of the specimens was of such a superior quality, that Mr. Bazley, M.P , who examined it, stated it was worth 1s. 6d. per lb., and he would give that price for any quantity of it. Mr. Smollett, M.P., who had passed 30 years in India, recently lectured on the subject of cotton in Manchester, and stated that cotton could be raised in any quantity in that country, and at low prices, if there were a reform carried out in the method of taxation. The people of India are taxed in a most arbitrary manner, and industry is thereby repressed.

The British government is making great efforts to develop the natural resources of India and promote her commercial interests, especially by the construction of railroads for inland communication. The statistics of Indian railroads show great development. During the year 1858, the East Indian Railroad carried 1,172,000 passengers, and made an estimated profit of 6¼ per cent on its capital. The Great Indian Peninsula Railroad, which is as yet open for a short distance only, shows a net per centage of 4½ The Madras Railroad yields 3½ per cent. The rate of dividend on ordinary share capital in England is 3.06, which is less than the worst of the Indian lines.

The French public is bestowing a great deal of interest and capital upon the isthmus of Nicaragua. A company has been formed at Marseilles, consisting of several large shipowners, who have purchased a grant of considerable land and mines, and valuable timber land, consisting chiefly of ebony, in Nicaragua. They have sent out two ships already with emigrants, consisting mostly of machinists, engineers and a few chemists, to form the nucleus of a colony. Another company is about being formed in the same city for constructing a railway on the isthmus of Rivaz, a tongue of land which separates the lake of Nicaragua from the Pacific. The French are going to make a desperate effort to obtain a foothold in Central America.

It has been found that puddled steel plates, employed in the hulls of steamers, are not suitable material for this purpose, in consequence of their rapid corrosion. The small steam launch which was built for Dr. Livingstone's African expedition was principally composed of this metal, and has proved a failure on account of rapid rusting. Another small vessel of nearly the same size, built of Howell's "homogeneous metal" (a species of steel also manufactured at Sheffield), has proved sound so far as it relates to corrosion; and Dr. Livingstone has stated that such metal is well adapted for boats in tropical climates.

INDUSTRY—MANUFACTURES—COMMERCE.

What we Pay for Silk.—The total value of silk fabrics exported to the United States from the city of Lyons alone, during the year ending Dec. 31, 1859, and for which invoices were authenticated at the office of the American consul, Joel W. White, was 6,148,808.17 francs; or in United States currency (at 19 cents per franc), $1,168,273.55. Our total import of silk from France, during the year 1859, was:—Piece goods of silk, $9,645,111; hosiery, &c., do, $113,937; floss silk, $1,074; caps, bonnets, and hats, $68,979; raw silk, $32,729; sewing silk, $23,306; twist, $3,531; piece goods of silk and worsted, $672,047; silk manufactures not specified, $900,147—total, $11,460,861.

Virginia Woolen Manufacture.—The Richmond *Enquirer* states that a number of new factories are in the course of erection in that city, and that a new woolen mill will be in operation by the first of March next, and will consume weekly from 8,000 to 10,000 lbs. of wool. A large sugar refinery is nearly completed; and four or five gentlemen with abundance of capital are about to establish a great tannery, with which an extensive boot and shoe shop is to be connected. In addition to these a manufactory of fire-arms, in which Col. Colt is interested, will soon be at work.

Silver from Lead Ore.—At the Eagle foundry, in Dubuque, Iowa, where lead smelting is carried on by M. Walter, a considerable amount of silver has been taken out during last year It has hitherto been supposed that there was not a sufficient amount of silver in our western lead ores to pay for any extra cost in smelting, but it has been found that as much silver may be extracted as will pay for the whole cost of smelting. Many of our lead ores may yet become very remunerative on account of the silver contained in them.

Fish Oils.—The inhabitants of Brooklin, Maine, are entirely engaged principally in fishing and seafaring. During the summer season a considerable business is carried on in the manufacture of porgy oil. From 500 to 1,000.bbls. have been made annually, worth from $15 to $20 per bbl. The flesh of the fish, after the oil is thus passed out, is very serviceable upon the soil of the town.

Railroad Cars.—Since last June, Messrs. Wharton & Petsch, car manufacturers, Charleston, S. C., have constructed for the Mississippi Central Railroad, 125 cars—80 of which were built in Charleston and 45 in New Orleans. The cost exceeded $80,000. They have also built cars for roads in South Carolina to the amount of $15,000.

What is the Meaning of "Merchantable?"—An interesting case has lately been decided in the Superior Court, Boston, in regard to what is called "merchantable" gunny cloth. The suit was by Messrs. Wm. Rice, and others against Messrs. Wm. C. Codman, and others, and the facts were substantially as follows:—The defendants sold to the plaintiffs (in 1858) 100 bales of gunny cloth at 15¼ cts. per yard, by an original invoice which represented its average weight at 2.15 lbs. per yard. The money for the goods was paid, though the goods were then in the government warehouse. The plaintiffs, after their purchase, sold 75 of the bales to a party who weighed a portion of the lot, and found, as was stated, that they only weighed 2.07 lbs. per yard. They shortly afterwards commenced suit to recover the 15¼ cts. per yard, which had been paid, and half a cent on every yard besides, which was the profit they expected to make; the whole, with the interest, amounting to $4,450. The plaintiffs endeavored to prove that the word "merchantable quality" meant such cloths as weighed 2.125 lbs. to the yard. Judge Lord instructed the jury to return an answer whether the word "merchantable" was understood by Boston merchants, according to a common custom, to mean gunny cloth weighing 2.125 lbs to the yard. The verdict was in the negative; no such meaning was attached to the word in this case. A general verdict was also given for the defendants. They imported the gunny cloth and sold it according to the foreign invoice.

Flax Manufacture.—During the past nine years Mr Stephen M. Allen, of Boston, has been engaged in experimenting with flax, and he has a mill near Boston, where various fabrics composed partly of cotton and flax are manufactured. He lately, in an address to the manufacturers of Rhode Island, stated that he believed flax could be cultivated and treated in such a manner as to make goods from it as cheap as those of cotton. He asks farmers to try the cultivation of flax. The sale of the seed alone would pay for all the labor. In reference to this subject the *Commercial Bulletin* (Boston) says: "The American Flax Company, of this city, have in operation at Watertown a mill where they have perfected their machinery to work up the straw into a fibrous material, which has been successfully spun into yarns, and woven into cloth with the different mixtures of wool and cotton. The straw, after passing through the crusher, comes out the quality of tow; it then passes through the various processes necessary to remove any of the woody substance and the gluten; and from the bleachery comes out a beautiful white, resembling cotton. We have seen plain cloth, calicoes, jeans and hosiery, with a mixture of from 25 to 50 per cent of flax cotton with the cotton and wool. With the former mixture the fabric presents a body superior to entire cotton; and with the latter the presence of the mixture (unlike the mixture of cotton and wool), is hardly discernable."

Shoemakers' Strike.—The shoemakers of Lynn and other towns in Massachusetts are now upon a strike for higher prices in most all styles of work. Some of the manufacturers, it is stated, are willing to advance, if all others agree to do so. It is admitted that the prices paid to journeymen are too low; but as there is a large quantity of goods on hand, it is held that manufacturers are not anxious to do much work at present, and that the strike will not affect them so injuriously as the workmen. Dr. Chalmers, in his political writings, counsels mechanics, when prices are low and the market overstocked, to cease from producing, as the best means of affording themselves a proper remedy.

THE RISE AND PROGRESS OF INVENTIONS.

ADVICE TO INVENTORS.

During the period of Fourteen Years which has elapsed since the business of procuring patents for inventors was commenced by MUNN & Co., in connection with the publication of this paper, the number of applications for patents in this country and abroad has yearly increased until the number of patents issued at the United States Patent Office last year (1859) amounted to 4,538; while the number granted in the year 1845—fourteen years ago—numbered 502—only about one-third as many as were granted to our own clients last year; there being patented, through the Scientific American Patent Agency, 1,440 during the year 1859. The increasing activity among inventors has largely augmented the number of agencies for transacting such business; and at this time there is scarcely a town of 4,000 inhabitants, but has its patent agent, patent lawyer, patent solicitor, or patent attorney, all of which terms are used to convey the same idea—viz., that their services are offered to the inventor or patentee for a pecuniary consideration.

In this profession, the publishers of this paper have become identified with the universal brotherhood of Inventors and Patentees at home and abroad, at the North and the South; and with the increased activity of these men of genius we have kept apace up to this time, when we find ourselves transacting a larger business in this profession than any other firm in the world. Year after year, we have increased our facilities for transacting patent business, by gathering around us a large corps of the most eminent engineers, draughtsmen and specification writers that can be procured. Among these gentlemen are those who have been connected with the United States and Foreign Patent Offices. The latest engagement we have made is the association with us of Hon. Charles Mason, formerly COMMISSIONER OF PATENTS, and favorably known to the Inventor as their friend and advocate. The memory of his acts while holding this high position will be cherished by many an honest inventor with gratitude as long as he lives.

The arrangement made with Judge MASON renders our facilities for prosecuting all kinds of patent business complete, however ample they were before; and without being accused of egotism, we may safely assert that no concern has the combined talent and facilities that we possess for preparing carefully and correctly applications for patents, and attending to all business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements. &c.

FREE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable are advised to make a sketch or model of their invention, and submit to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons, under the direction of a gentleman who has spent a lifetime about the Patent Office. Over 1,500 of these examinations were made last year through this office, and as a measure of prudence and economy, we usually advise inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared on reasonable terms, by sending a sketch and description of the invention. The government fee for a caveat is $20. A pamphlet of advice regarding applications for patents and caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention, if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition is composed for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fee, by express. The express charges should be prepaid. Small models, from a distance, can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park-row, New York.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, enclosing the official letters, &c.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery Lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that three-fourths of all the European patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pur-

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sued in obtaining patents in foreign countries through our Agency the requirements of the different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our branch offices.

INTERFERENCES.

We offer our services to examine witnesses in cases of interference, to prepare arguments, and appear before the Commissioner of Patents, or in the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of "Hints to Inventors." Furnished free. Address MUNN & CO., No. 37 Park-row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Many persons have been ruined from adopting the "penny-wise and pound-foolish" maxim, when an investment of a few dollars, to have been informed of their rights, would have saved them much anxiety and money. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. Judge MASON assists in all examinations of this kind.

For further particulars, address MUNN & CO., No. 37 Park-row, New York.

EXTENSIONS OF PATENTS.

Valuable patents are annually expiring, which might be extended, and bring fortunes to the households of many a poor inventor or his family. During the past fourteen years, we have had much experience in procuring the extension of patents; and, as an evidence of our success in this department, we would state that, in all our immense practice, we never lost but two cases—and those were unsuccessful from causes entirely beyond our control.

It is important that extension cases should be managed by attorneys of the utmost skill to ensure success. All documents connected with extensions require to be carefully drawn up, as any discrepancy or untruth exhibited in the papers is very liable to defeat the application.

Of all business connected with patents, it is most important that extensions should be intrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office, and the manner of presenting it. The heirs of a deceased patentee may apply for an extension. Parties should arrange for application for an extension at least six months before the expiration of the patent.

For further information, as to terms and mode of proceedure in obtaining an extension, address MUNN & CO., No. 37 Park-row New York.

ASSIGNMENT OF PATENTS.

The assignment of patents and agreements, between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

PATENT CLAIMS.

Persons desiring the claims of any invention which has been patented within 14 years can obtain a copy by addressing a note to this office, stating the name of the patentee, and date of patent when known, and enclosing $1 as fee for copying. Address MUNN & CO., No. 37 Park-row, New York.

CAUTION TO INVENTORS.

Messrs. MUNN & CO. wish it to be distinctly understood that they neither buy nor sell patents. They regard it as inconsistent with a proper management of the interests and claims of inventors, to participate in the least apparent speculation in the rights of patentees. They would also advise patentees to be extremely cautious into whose hands they entrust the power to dispose of their inventions. Nearly fifteen years' observation has convinced us that that the selling of patents cannot be conducted by the same parties who solicit them for others, without causing distrust.

BUSINESS CONDUCTED CONFIDENTIALLY.

We would inform inventors that their communications are treated with the utmost confidence, and that the secrets of inventors confided to us are never divulged, without an order from the inventor or his acknowledged representative.

MODELS BY EXPRESS.

Inventors sending models to our address should always enclose the express receipt, showing that the transit expenses have been prepaid. By observing this rule we are able, in a great majority of cases, to prevent the collection of double charges. Express companies, either through carelessness or design, often neglect to mark their paid packages, and thus, without the receipt to confront them, they mulct their customers at each end of the route. Look out for them!

HISTORY OF THE "SCIENTIFIC AMERICAN" AND IMPORTANT INFORMATION TO PATENTEES.

We have printed a supplementary edition of the SCIENTIFIC AMERICAN, with illustrations of the building, externally and internally, showing the spacious rooms in which our immense patent business is conducted, and with life-like representations of the artists, engineers and specification writers at their daily labors. The same paper contains information on the many intricate points arising in patent law and practice, and contains the best popular treatise on the subject ever published; it should be in the hands of all who are interested either in procuring, managing or using patented inventions. The legal information contained in this paper is the result of FOURTEEN YEARS' experience as patent solicitors, and it cannot be found in any other treatise on patent law. It also contains information in regard to Foreign Patents and Extensions. It is published in octavo form, sixteen pages, and mailed upon the receipt of two three-cent stamps. Address MUNN & CO., No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the inventor or patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, 37 Park-row, New York, where any questions regarding the rights of patentees will be cheerfully answered. Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING FEBRUARY 21, 1860.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

27,195.—Robt. Anderson, of Brooklyn, N. Y., for an Improvement in Machines for Hulling and Finishing Rice:

I claim a series of revolving beaters of alum-dressed hide, acting to finish the rice, substantially in the manner specified.

27,196.—S. R. Atkins and J. R. Hitchcock (assignors to J. R. Hitchcock), of Plantsville, Conn., for an Improved Sausage-filler:

We claim a revolving presser, d, within the case, a, with the cut-off i, in the manner as and for the purpose substantially as described.

27,197.—F. L. Baily, of Boston, Mass., for an Improvement in Printing Presses:

I claim giving to the vibrating platen its periods of rest and motion for the purpose described, when operated by the arms, 11, 11, and shaft, 1.

Second, I claim the cavity, d, and screw, b, for the purpose set forth.

Third, I claim the combiuation of the rack, G, and cam, P, for the purpose set forth.

Fourth, I claim the combination of the guide, K, and vibrating platen, D, for the purpose set forth.

27,198.—E. C. Betts, of Huntsville, Ala., for an Improvement in Presses:

I claim, first. The combination o f the rack bars, F F, and the lever G, when the latter is provided with the pawls, I I, and the movable fulcrum rods, H H, arranged to operate as and for the purpose set forth.

Second, The arrangement of the movable or sliding box, B, and follower rack bars. F F, operated as shown, to admit of the exposure and consequent accessibility of the compressed article, for the purpose specified.

27,199.—H. F. Bond, of Waltham, Mass., for an Improved Bread-slicer:

I claim the combination and arrangement of the eccentric gear wheels, B and C, the knife, G, the lever, E, the carriage, I, and the rack, D, all substantially as and for the purpose specified.

27,200.—Max Braun, of Brooklyn, N. Y., for an Improvement in Inkstands:

I claim the chamber, E, with flexible perforated diaphragm, e, hollow stem, D, and tubes, a b, combined with a fountain cup, B, and arranged in the manner and operating upon the principles set forth.

[This invention consists in a peculiar constructed top for the ink-cup, and the novel introduction of a small finger force pump for increasing the pressure of the air in the ink in the cup, and in this manner forcing it up into a fountain cup, by supplying new air instead of densifying the air in the reservoir in the present manner where flexible diaphragams are used to raise the ink by pressing on them The device is to be so constructed that the fountain cup can be filled with ink, or only partly filled, and so that all the ink in the fountain cup may be driven back into the reservoir by removing a portion of the air above the ink into the reservoir.]

27,201.—Hugh B. Brown, of Huntington, N. Y., for an Apparatus for Teaching Orthography, &c.:

I claim the arrangement upon axes in a frame, as described, of a a series of blocks with printed or otherwise marked, and with blank sides, substantially as and for the purposes set forth.

27,202.—Wm. A. Carpenter, of Elgin, Ill., for an Improved Permutation Lock:

I claim, first, The employment of a bolt, C, which is of a form approximating to a circle, and is arranged so as to be adjusted on a solid spindle, C', which has an index, e, on its front end, in combination with the face plate of a safe door or a lock which has a circle or a part of a circle of figures, or characters, D, marked on it, substantially as and for the purposes set forth.

Second. The combination of a series of bolts, C, of the form stated, having index spindles, d, C' e, with a series of circles or parts of circles of figures or characters, D, on the face of the lock or safe door, substantially as and for the purposes set forth.

Third, The combination with the bolts, C, having index spindles, C' d e, of a turning shaft, H, a wedge plate, I, of the same shape circumferentially, at the bolts, a series of spring catches, F F, a series of short levers, G G, a series of stops, I, I', and a series of indented plates, E E, substantially as and for the purposes set forth.

27,203—Thos. Castor, of Philadelphia, Pa , for an Improvement in Passenger Railway Cars:

I claim, first, The frame H, trussed and otherwise constructed, substantially as set forth, combined with and connected to the roof, F, of the car, and arranged on the same in respect to the opposite ends, C and C', of the car, as and for the purpose set forth.

Second, I claim the detachable spiral ladder composed of the pole, I, its "rounds" m, and connecting rib, n, when the said ladder is arranged in respect to the platform, B or B', and overhanging portions e or e', of the roof and connected to the same, substantially in the manner specified.

Third, I claim the guards, P P, constructed and applied to the car, substantially as set forth, when the said guards are arranged to be controlled by the foot of the driver through the medium of the vertical rods, R, and the levers, Q Q', or their equivalents, as set forth for the purpose specified.

27,204.—G. B Clark, of Leonardsville, N. Y., for an Improvement in Ventilating Apparatus:

I claim combining with the damper, f, and an air valve, j, or their equivalents, the slotted crossbar, H, guide bracket, o, and twisted rod or wire, G, substantially in the manner and for the purposes specified.

[This invention consists in combining a damper and an air valve with a twisted rod in such a manner that the expansion or contraction of the said rod caused by the increasing or decreasing temperature of the stove-pipe causes the damper to close and the air valve to open, or vice versa. By these means the temperature of a room regulates itself in a simple and efficient manner.]

27,205.—E. B. Clement, of Barnet, Vt., for an Improved Churn:

I claim the arrangement of the toggle-joint, F, walking beam, E, crank, H, and connecting shaft, I, operating substantially as described and for the purpose set forth.

27,206.—A. H. Crozier, of Oswego, N. Y., for an Improved Machine for Cutting and Distancing Locks on Hoops:

I claim hinging the jaws which hold the hoop, so as to allow them to vibrate, or arranging them to traverse, and mounting them on a spring, substantially as described, so that may be moved to carry or feed the hoop to the cutter that cuts the lock or score; and in combination with the jaws for holding the hoop, I claim the cutter for cutting the lock.

I claim a yielding gage, so constructed as to allow the operator to vary the length of the hoops somewhat in proportion to the thickness or crooks in the hoop worked.

27,207.—S. S. Curtis, of Croton Corners, N. Y., for an Improvement in Cooking Stoves:

I claim curving the fire-back, K, concentrically with the line described by the grate, g, when vibrated or turned substantially as and for the purpose set forth.

27,208.—J. A. Davis, of New York City, for an Improvement in Sewing Machines:

I claim connecting the lever, B, having its fulcrum near to the power shaft, as set forth, with or to the driver, C, by the spring, E, or flexible bar, as and for the purpose described,

27,209.—Sylvester Denton, of Penn Yan, N. Y., for an Improvement in Fences:

I claim the sill, A, upright, B, post, D, cleats, F, and brace, H, and the method of securing it, when constructed and arranged as specified and for the purposes set forth.

27,210.—George W. Dickinson, Jr., of Breckenridge, Va., for an Improved Surveying Compass:

I claim the arrangement of the scales, e f g and h, in combination with the main semi-circle, C, and with the additional semi-circle, F, and protractor, G, constructed and operating substantially as and for the purpose specified.

[The object of this invention is to arrange a surveyor's compass in such a manner that the same, by means of a series of adjustable scales, serves to solve all triangles, and consequently all rectilinear figures which may occur in the various operations of a surveyor, and at the same time it facilitates materially the drawing of said figures.]

27,211.—H. W. Dopp and William K. Mead, of Buffalo, N. Y., for an Improvement in Burners for Vapor Lamps:

We claim, first, The arrangement of the pipe, A, wick tube, c, and stop-cock, o', by means of which the fluid is supplied to either or both of the pipes or tubes, A and c; said cock being operated by means of a cam wheel, D, substantially as and for the purpose specified.

Second, Arranging the burner, G, with the heater, B, in the manner specified; the burner being secured to the heater, and the heater being provided with pins, E, whichpass through the dark portion of the flame above the burner, substantially as specified.

Third, The arrangement of the burner, G, heater, B. pipe, A. and tube, C, together, substantially in the manner and for the purpose specified.

27,212.—Eliakim B. Forbush, of Buffalo, N. Y., for an Improvement in Apparatus for the Ventilation of Railroad Cars:

I claim the arrangement of the revolving aprons, A A', water and ice tank, E, and stove, K (or other heating apparatus), in a separate apartment or room within the car, relatively to the blower, H, for the purposes described.

I claim the described arrangement of the distributing air pipes, S S' and T, when arranged relatively to the described apparatus for purifying the air from dust, as set forth.

27,213.—Wm. L. Force, of Keyport, N. J., for an Improvement in Oyster Dredges:

I claim, first, The combination of the sled runners, A A. and deflecting board, F, when the same are arranged in the manner and operate as set forth.

Secone, I claim the flat-headed rake head in combination with the teeth, a a, when said teeth are bent over the front edge of the head; all in the manner and for the purposes set forth.

27,214.—James E. A. Gibbs, of Mill Point, Va., assignor to J O. Wood, of New York City, for an Improvement in Sewing Machines. Ante-dated August 21, 1859:

I claim, first, The mechanical production of the interlaced chain-stitch in an organized sewing machine, by the combination with the reciprocating eye-pointed needle and discoidal thread case or rotary hook and bobbin, or their equivalents, of the described automatic feeding mechanism to the cloth when so arranged in relation to, and operating in concert with, the said devices as to cause each loop taken from the needle to be carried by the hook through the preceding loop, substantially in the manner described.

Second, The combination and arrangement, substantially as described, of the eye-pointed needle, discoidal thread case, provided with two loop-taking hooks, with an automatic feed mechanism, operating in the manner set forth, so that a mere change in the direction of the feed shall effect the difference described between the several stitches.

27,215.—Jeremiah Heath, of Providence, R. I., for an Improvement in Heel Screws for Skates:

I claim the wheel and screw, arranged and operating substantially in the manner and for the purposes set forth.

[This invention consists in fixing in the center of a suitable wheel furnished with handles or holes punched in its periphery a suitable screw which is capable of being rotated with the roller, and which, by turning said roller, will be forcibly driven into the heel of the boot either before or after the skate is strapped to the foot.]

27,216.—Chauncey O. Green, of Troy, N. Y , for an Improvement in Cooking Stoves:

I claim the hollow, cylindrical transversely grooved grate bar, or grate bars, N, when arranged lengthwise of, and so as to be capable of revolution within, the oblong fire-box, A, and having communication at one end with the open air and at the other end communication with the smoke flues of the stove, by means of an air passage or air passages, arranged in contact with the outside of, or leading through, the part or parts of the oven not sufficiently heated by the fire-box and smoke flues, substantially as and for the purposes set forth.

27,217.—Joseph Grice, of New York City, and Robert H. Long, of Philadelphia, Pa., for an Improvement in Running Gear for City Railroad Cars:

We claim the vibrating truck, C, pivoted in advance of its axles in the line of motion of the car, in combination with the arcs, C' and C2, and friction rolls, K, with suitable bearing surfaces in the bottom of the car body; the whole constructed and operating substantially as specified for the purpose set forth.

And we also claim, in combination with a vibrating truck pivoted at a point not over the axles, the employment of sustaining arcs, so arranged on each side of the axles as to support the car and relieve the turning point of all weight, as specified.

27,218.—Thos. Hanson, of New York City, for an Improvement in Apparatus for Supplying Water to Buildings:

I claim combining the engine which is operated by the head of water with the pump, forcing water to the upper part of the building by means of a lever with a shifting adjustable fulcrum, substantially as and for the purpose specified.

I also claim the arrangement, substantially as described, of the engine and pump, so that the connecting lever can be removed and a hand lever substituted, as described, that the pump may be operated by hand when, from any cause, the pump cannot be operated by the engine.

I also claim the split packing rings and plates secured thereto, substantially as described, in combination with the conical boss on the piston rod, substantially as described, to render the piston self-packing by the pressure of the fluid.

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27,219.—Samuel H. Gilman, of New Orleans, La., for an Improvement in Apparatus for Evaporating Saccharine Juices:

I claim, in the construction of pans or kettle for evaporating saccharine juices or other liquids, making the bottoms thereof of a series of vertical compartments, open at the upper edge to receive the liquid from the upper part of the pan or kettle and closed at the bottom, except for the purpose of connecting the inside of the series, and with open spaces between every two of the series forming continuous passages open to the flue space, except where obstructed by the connecting pipes for the action of the products of combustion, substantially as and for the purpose specified.

I also claim making each of the said compartments of the series constituting the bottom of a pan or kettle, separate from the others and from the upper part of the pan or kettle, and provided with flanches to connect it with the series and with the lower edge of the upper part of the pan or kettle, substantially as and for the purpose specified.

I also claim increasing the heating surface of each pan or kettle of a train relatively to its liquid cubical contents, in the ratio of its greater distance from the furnace, by making the series of compartments constituting the bottom thereof, substantially as described, of greater depths each in succession as they are more distant from the furnace, for the purpose described.

I also claim the manner, substantially as described, of connecting the series of pans or kettles constituting the train by means of the flaring sides, substantially as described, in combination with the manner of connecting the bottoms therewith, substantially as described and for the purpose specified.

And finally, I claim the vibrating dipper, connected and combined with the pans or kettles, substantially as described, for the purpose of transferring the liquid from one pan to the next in the train, as set forth.

27,220.—George E. Hoyt, of Brooklyn, N. Y., for an Improvement in Machinery for Breaking Coal:

I claim, in connection with the plunger and screen, the gage, M, and rake, H, arranged substantially as and for the purpose described.

[This invention consists in the employment of a plunger armed with teeth, and placed over an intermittingly rotating or a rectilineally-reciprocating screw, which serves as a bed for the toothed plunger; the above parts being also used in connection with a gage and rake, and the whole arranged to operate in such a manner that the coal may be broken and screened with but little waste and in a very expeditious manner.]

27,221.—Charles W. Hubbard, of Pittsburgh, Pa., for an Improved Machine for Grinding and Polishing Saws:

I claim the use of an adjustable friction roller, set in a swinging frame and pressed up by springs, in combination with another friction roller on a permanent revolving axis, for the purpose of revolving the saw at an uniform speed differing from that of the grindstone, independently of the motion of the stone and unaffected by it; thus preventing the tendency of the stone to affect the revolutions of the saw.

27,222.—Enoch Jacobs, of Cincinnati, Ohio, for an Improvement in Joining Plates of Metal:

I claim the construction of the joint, made by means of the closely abutting plates, A A, and the flat and semi-cylindrical plate, b b′, and rivets, c c, substantially in the manner and for the purposes set forth.

27,223.—Daniel Jones, of Boston, Mass., for an Improved Steering Apparatus:

I claim the direct application of the power of the traversing screw, H, to the tiller, C, or the yoke tiller, L, in the manner described, when the steering wheel operates the screw, H, by single gear, and is placed on the middle line of the ship, as specified and shown.

I also claim, in combination with the above arrangement, the cam yoke tiller, L, constructed and operated substantially as described.

27,224.—Gilbert Daniel Jones, of New York City, for an Improvement in Mills:

I claim constructing the bottom or grinding surfaces of the runners conical, in the form of an inverted cone, and the bed in and around which they revolve with corresponding conical surfaces, substantially in the manner described.

27,225.—W. J. Johnson, of Newton Corner, Mass., for an Improved Dish Cloth-holder:

I claim the described dish cloth-holder, constructed with round or square jaws or tines, and bent or curved in such a manner that the cloth will be suitably retained by the same and held in a closed state by a metal slide, or its equivalent, forming a new article of manufacture.

[This invention, which consists of three curved prongs and a slide, is a novel device for holding a dish cloth for washing dishes, bottles, and small-mouthed vessels which are difficult to make clean. It is an exceedingly simple article, easily made, holds the cloth securely, and is very handy to use. It keeps the hands out of hot water, and is a useful and cheap article for the culinary department.]

27,226.—Ferdinand C. Lighte, of New York City, for an Improvement in Grand Piano-fortes:

I claim the construction of the iron frame with two plate-like portions, A B, one elevated above the other, and with an opening, a b, between them for the turning pins of the wrest plank, and constructing the wrest plank with a step, h, and fitting it to the bottom of said parts, A B, of the frame; all substantially as described.

[This invention consists in a certain novel construction of, and mode of combining, the wrest plank and the iron frame of a grand piano-forte, whereby the wrest plank is better sustained by the frame against the strain of the strings than it is in other grand piano-fortes.]

27,227.—John Lippincott, of Pittsburgh, Pa., for an Improvement in the Manufacture of Axes:

I claim making axes with a head of cast iron, cast into and around a steel bit, and afterwards finished and dressed, as hereinbefore described, as a new article of manufacture.

27,228.—John W. Lyon, of Brooklyn, N. Y., for an Improved Machine for forming Guard or Gas Cocks:

I claim the combination of the taper mandrel, L, with the rotating cutter, H, substantially in the manner and for the purposes herein described.

The arrangement of the adjustable gage, Q, with relation to the mandrel, L, substantially as described.

27,229.—A. G. Mack, of Rochester, N. Y., for an Improvement in Last-holders:

I claim the arrangement of the movable standard, M, and spring rod, r, with the upright standard, B, sliding rest, D, and eccentric, E, as and for the purposes set forth.

27,230.—Wm. S. Mead and H. W. Dopp, of Buffalo, N. Y., for an Improved Ventilating Valve for the Delivery of Liquids:

We claim the employment of an elastic diaphragm, B, provided with a ventilating tube, C, in combination with an air chamber, A; the whole being arranged and constructed substantially in the manner and for the purpose set forth.

27,231.—Rensselaer Merrill, of Elmira, N. Y., for an Improved Clothes-dryer:

I claim the combination of the collar, C, cap, A, and braces, D and E, with the radial arms, B, when constructed and arranged in the manner and for the purpose set forth.

27,232.—John S. Mitchell, of South Boston, Mass., for an Improvement in Spring Skates:

I claim an improved skate as having its foot rest, A, constructed not only with sockets, a a, for the reception of helical springs, b b, for supporting the foot rest on the runner, B, but with separate sockets, c c, and lateral passages, d d, arranged with reference to the springs, b b, substantially in the manner and to receive tenons and holding pins or stops connected with the runner as hereinbefore described.

27,233.—Elias Parish and Watson Parish, of Galesburgh, Ill., for an Improvement in Mole Plows:

We claim, first, The combination of the grooved hinged piece, B, with the coulter, C, and mole part, A, arranged and operating substantially as set forth.

Second, The combination of the hinged plane, E, roll, F, hinged bearings, h h, and scrapers, f f, with the rear end of the draft beam, D, substantially as set forth.

27,234.—Johan F. C. Peikhardt, of New York City, for an Improved Sofa Bedstead:

I claim, first, The arrangement of the cushions, K L M, as shown and described, to wit, the cushions, L M, connected by hinges, f, cushion, L, being attached to the bars, I, by means of the hooks, g g, fitting in the slots, h h, thereof, and the cushion, M, attached to the posts, A A, by means of journals, j, fitting in either of two pairs of grooves or recesses, k l, while the cushion, K, is connected to the bars, I, by hooks, n, fitting in the slots, h, substantially as and for the purpose set forth.

Second, In combination with the cushions, K L M, the adjustable and folding side pieces, O O, arranged as shown to form sides for the article, when used as a bedstead, and be capable of being folded compactly against the side rails, D, when the article is used as a sofa.

[The object of this invention is to combine a sofa and bedstead in such a manner that the device may be converted from one of the above-named articles to the other, and vice versa, with the greatest facility, and made to serve in either capacity equally as well as articles made especially for either purpose.]

27,235.—Worden P. Penn, of Belleville, Ill., for an Improvement in Horse-powers:

I claim the combination of the loose cap, C, with the hub, E, of the wheel, D, and the ends of the bars, B, and also bracing the said bars from the said cap, c, by means of chains, e e e, for the purpose of taking the stress off of the rim of the wheel, D, and concentrating it in the said cap, and also the combination of the spider bracket, b, with the loose cap, c, and the center pin and the hub, E, for the purpose of securing the ends of the bars, B, substantially as described.

27,236.—Thaddeus S. Scoville, of New York City, for an Improved Mosquito Bar:

I claim the combination and arrangement of the supporting posts, p p, adjustable doubly-turning hinges, f f, curtain frame, c d, cords, i i, pulleys, k k, and balance weight, l, substantially in the manner and for the purpose specified.

27,237.—Thomas S. Smith, of Cincinnati, Ohio, for an Improvement in Floors of Malt Kilns:

I claim in combination with the perforated plate, A, the tesselated frame work, C B, the upper edges of which are rounded as described; the whole being arranged in the manner as set forth, for the purpose of enabling the heated air to pass equally upward through the perforated plate, there being no obstructing surface under the said perforated plate.

27,238.—Abraham Reese, of Pittsburgh, Pa., for an Improved Rivet and Bolt Machine:

I claim, first, The use of a sliding die carriage working upon rollers, in the manner described.

Second, The combination of a heading tool, re-acting by means of a spring with a trip hammer, so arranged as to give repeated strokes on the heading tool between each stroke of the griping dies and with dies forming a matrix for the head of the bolt or rivets, for the purpose of forging the heads of bolts and rivets into shape when inclosed in a die by repeated blows of the hammer on the heading tool working in the cavity of the heading dies, in the manner hereinbefore described.

27,239.—P. H. Roots, of Connersville, Ind., for an Improvement in Water Wheels:

I claim the recesses, f, and the pistons, C, of described configuration, so as to insure requisite strength, in combination with the cylinders, A D, so as to prevent the retardation of the piston by the water as the pistons enter and leave the recesses, substantially as and for the purposes set forth.

27,240.—Augustus Pruyn, of Albany, N. Y., for an Improved Device for allowing for Contraction or Expansion of Buck Saw Blades:

I claim the combination with the saw blade and saw frame, of a spring, c, when the said spring is placed within a slotted opening in the blade, and covered by the frame, as and for the purpose shown and described.

[This invention relates to an improvement in that class of hand saws which are formed of thin narrow steel plates or strips strained in frames, such as those for sawing fire-wood, frequently termed buck saws, and also those used by joiners and others for sawing scroll or curved stuff. The object of the invention is to obviate the difficulty hitherto attending the expansion of the saw consequent on the heating of the same by friction, and also avoid the loosening or slackening of the saw produced by the spring of the frame.]

27,241.—August Semmendinger, of New York City, for an Improvement in Photographic Cameras:

I claim the spring board, A, in combination with a photographic apparatus, in the manner and for the purpose substantially as described.

Also the double grooves, e′ and n′, and the double tongues, e and n, in combination with the glass-holder, B, substantially in the manner and for the purpose set forth.

27,242.—George W. Ramsey, of New York City, for an Improvement in Steam Plows:

I claim the arrangement of the plow cylinders, J J, driving wheels, guide wheel, boiler and engines; the whole being constructed, operated and operating as shown and described.

27,243.—Alva M. Southworth, of Dorchester, Mass., for an Improved Attachment for Sail Cringles:

I claim the arrangement of the broad metallic plate secured to the yard, and having formed on it a flange or shoulder, and the sliding hook engaging with the said flange or shoulder and the head cringle of the sail, as described.

27,244.—Timothy Sullivan, of New York City, for an Improved Tool for Cutting and Pulling Thread:

I claim, first, The combination of the blade, A, with the finger-like prong, B, or its equivalent, substantially in the manner and for the purpose specified.

Second, The arrangement of the spring jaw, D, in combination with the blade, A, and prong, B, constructed and operating substantially as and for the purpose described.

[This invention relates to a very simple and effective implement for pulling out basting thread. Its utility will be easily understood by every tailor or seamstress, and its simplicity recommends it to the public.]

27,245.—Benedict Swain, of Washington, D. C., for an Improvement in Projectiles for Fire-arms:

I claim the combination of a flat spiral tail with a conical tail so constructed as to form a shoulder for the wooden packings to rest against, thereby causing the head of the shell to receive the full force of the discharge of the gun, at the same time I secure the wooden packings at the extreme end by the use of a metal sabot which sabot also protects the composition which is pressed in the hollow shaft in the tail, intended for a rocket or to fuze the head of the shell.

27,246.—Aaron W. Sweet, of Cincinnati, Ohio, for an Improvement in Conical Grinding Mills:

I claim, in combination with the conical cracking and grinding surfaces on the burr and concave, the feeding cone and its concave, constructed and arranged substantially as described.

27,247.—H. R. Taylor, of Roxbury, Mass., for an Improvement in Supporting Furniture Drawers:

I claim bringing out the slides, B, with the first part of the movement of the drawer, substantially as set forth.

27,248.—Charles Von Bonhorst, of Hancock, Md., for an Improvement in Lamps:

I claim the combination of the air space, c′, air space, B, draft passage, c, and draft passage, a, in the manner and for the purpose described.

[This lamp has two wick tubes with an air space between and around them. The flames of the two wicks mingle together, and the smoke between and around the bases of the flames is supplied wit oxygen, so that perfect combustion is accomplished, and the lamp sends forth a brilliant flame without smoke. This is a simple, good lard lamp.]

27,249.—A. A. Washburn, of St. Johnsville, N. Y., for an Improved Washing Machine:

I claim the arrangement of the fluted rollers, E, in the stationary washboard, D, and combination with the corrugated bottom of the tub and with the concaves, i, in the pounders, F, substantially as and for the purpose specified.

[This invention relates to certain improvements in that class of washing machines in which a concave swinging tub and a stationary washboard, together with two pounders, are employed. Fluted rollers in the washboard and a corrugated bottom, together with the peculiar shape of the pounders, facilitate the washing, and the operation is rendered quite easy by means of a counterpoise on the top of the tub.]

27,250.—John W. Wheeler, of Cleveland, Ohio, for an Improvement in Grain Mills:

I claim, first, The stationary adjustable hopper, C, in combination with the plate, Z, for regulating the feed of the grain to the cones.

Second, I claim the recess or grooves, d′, between the dress rings, whether in connection or not with extending a few of the teeth or ridges, e′, of the dress across the recesses or grooves, as and for the purposes set forth.

27,251.—Andreas Willmann, of New York City, for an Improvement in Compositions formed of Caoutchouc:

I claim the combination with the rubber or its compounds of coke, or its equivalent, when reduced to a finely divided state, together with the anhydrous alkaline salts mentioned, and when the latter be used separately or in combination, substantially in the manner and for the purposes set forth.

27,252.—Charles B. Withington, of Rock, Wis., for an Improvement in Harvesters·

I claim the combination of the spring, W, connecting rod, V, shaft, i, sliding rake head, L′, guide, q, loose pulley, f, ratchet wheel, j, spring, g, and catch, h, when these several parts are arranged in relation to each other and to the main frame and platform in the manner described, for the purposes specified.

27,253.—A. H. Wood, of Boston, Mass., for an Improved Engraver's Vise:

I claim the combination of a proper spring and the tilting frame, e e, operating together in a suitable stock or standard, as described and for the purpose specified.

27,254.—Charles Wray, of San Francisco, Cal., for an Improvement in Furnaces for Plating Iron:

I claim combining with the crucible and the means of applying heat thereto, the employment of a muzzle or roof to the crucible, leaving a narrow opening on opposite sides for introducing the sheets of iron or other articles to be plated, and for drawing them out of the molten metal, substantially as and for the purpose specified.

And I also claim, in combination with the crucible covered with a muzzle or roof and heated in the manner described, the placing of the fire-door or doors above the muzzle or roof, substantially as and for the purpose specified.

I also claim, in combination with the crucible covered with a muzzle or roof and heated as described, making the openings through the outer shell of the furnace inclining upward and outward from the opening in the crucible, through which the articles being plated are drawn out of the crucible, substantially as and for the purpose specified.

And I also claim, in combination with the crucible and the surrounding fire chamber, constructing the side walls of the surrounding masonry with an opening in area equal to the sectional capacity of the internal chamber which contains the crucible, and closing such opening with movable sections, substantially as and for the purpose specified.

27,255.—Jones Yerkes, of Philadelphia, Pa., for an Improved Refrigerator:

I claim the upper chambers, G and G′, with their respective openings, b and c, the lower chambers, H and H′, with their respective openings, d and e, the ice chamber, I, and the cold air chamber, J, with its partition, h; the whole of the above-mentioned parts being arranged in respect to each other and to the air chamber, C, as and for the purpose set forth.

27,256.—N. B. Cleveland (assignor to Lyman Updike and J. M. Hosmer), of Waupun, Wis., for an Improved Submerging Barrel Head:

I claim the employment of the head, A, provided with the movable arms, B B, when the same is used substantially as and for the purpose specified.

27,257.—John M. Jones (assignor to himself and H. O. Ames), of New Orleans, La., for an Improvement in Skimmers for Sugar Juices:

I claim, as an improved article of manufacture, a skimmer for sugar and other substances, composed of a metallic bowl, A, and an air chamber or float, D, constructed and combined substantially as shown and described.

27,258.—Daniel B. Neal and H. C. Emery) assignors to themselves and Geo. E. House), of Mount Gilead, Ohio, for an Improvement in Apparatuses for Evaporating Sacharine Juices:

We claim, first, The employment in the furnace, A, of two flues in combination with a central cooling air chamber under the pan, the flues being divided from each other by means of a wall, B, and which are provided each with a series of dampers, C C′, substantially as and for the purpose specified.

Second, Providing the bottom of the pan with two flanges which fit snugly against the sides of the wall, B, the flanges, the wall and the bottom of the pan forming the four sides of an air chamber under the pan, substantially as and for the purpose specified.

27,259.—Charles L. Robinson, of Waukesha, Wis., assignor to himself and Thos. G. Eggleston, of Fox Lake, Wis., for an Improvement in Tanning:

I claim the employment, as and for the purposes specified, in combination with the purified terra japonica liquor described, of carbonate, sulphate or calcined magnesia and sulphate of potassa in about the proportions set forth.

27,260.—James Rowe (assignor to himself and Martin B. Ewing), of Cincinnati, Ohio, for an Improvement in Sewing Machines:

In combination with a needle of a sewing machine, I claim the double-eyed curved looper, T, as constructed, the same being made to operate in the manner substantially as set forth for the purpose described.

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27,261.—Elisha M. Smith, of Indianapolis, Ind., assignor to himself and Elbridge G. Mayhew, of Shelbyville, Ind., for an Improvement in Molding Machines:

I claim the combination of variable guides and their necessary appendages with a sash or molding machine, substantially as described in the specification.

27,262.—George Elliott and George F. Elliott, of Manchester, Conn., for an Improvement, in Locks:

We claim, first, The combination of the hook plates, B B′, spring pivot, h h′, and inclined slotted eccentric rim, F, the whole constructed, arranged and operating substantially as and for the purpose described.

Second, The movable tumbler, E, in combination with the hook plates, B B′, spring pins, h h, and eccentric rim, F, substantially as and for the purpose described.

[This lock has a series of circular hook plates, so arranged in a case that, in order to unlock the lock, it is first necessary to disconnect said plates by certain movements of the key. The operation of unlocking is very simple and easy to those initiated, but rather difficult and tedious to the burglar. The construction is simple and cheap We regard it as a good contrivance.]

RE-ISSUES.

R. H. Cole, of St. Louis, Mo., for an Improvement in Making Nuts. Patented June 3, 1856:

I claim forcing a portion or the whole of the metal displaced in forming the holes in the nuts in the bodies of the nuts, by which I am enabled to make the nuts thicker and more compact than the bar from which they are cut, all substantially as set forth.

R. H. Cole, of St. Louis, Mo., for an Improvement in Nut Machines. Patented June 3, 1856:

I claim the arrangement of the reund punch, f′, with an aperture in the angular punch, d, at the same time that a round punch, e, is arranged within an aperture in the bottom, j, of the nut box, when the said round punches are combined with the movements which causes them to act jointly in perforating holes in the nuts formed in said nut box, substantially as described.

I also claim the joint arrangement of the angular punch, d, and its interior round punch, f′, with the bottom, j, of the nut box and the interior round punch, e, when the said bottom of the nut box is combined with a spring, or its equivalent, in such a manner in relation to the said angular punch, d, and the round punches, e and f′, that the action of the said parts in forming a nut will cause the completed nut to be thicker than the bar from which the blank was cut, substantially as set forth.

James M. Dick, of Buffalo, N. Y., for an Improvement in Railroad Frogs. Patented Aug. 3, 1858:

I claim combining the four rails, arranged in the manner described, to form a frog by attaching them separately to a series of separate chairs, in manner substantially as described, so that each part may be removed for repairs and replaced independently of the other parts, as set forth.

I also claim holding down the movable end of the springing rail of the frog to its chair, so that it shall be free to expand and contract and spring laterally by combining it with the chair by means of the lip extending under and embracing the chair, substantially as described.

George C. Dolph, of West Andover, Ohio, for an Improvement in Mowing Machines. Patented Sept. 8, 1857:

I claim atta hing the cutter bar, B, and cutter, A, to the front of the frame of the machine by means of a plate or bar, so arranged that its front end may be raised or lowered by a lever independently of the main frame of the machine, and thus give to the cutting apparatus a tilting or rocking movement which will elevate and lower the points of the fingers, said parts being constructed and applied to the patented machine of E. Ball referred to, in the manner substantially as described.

[This invention consists in giving the cutter bar and cutter an adjustable movement independently of the frame of the machine, so that the cutter or sickle may be raised and lowered and adjusted at any desired point, without moving or at all affecting the frame of the machine.]

James Powell (assignee of Martin Robbins and James Powell), of Cincinnati, Ohio, for an Improvement in Faucets. Patented Dec. 21, 1858:

I claim, first, The application to the key stem the collar, I, cushion, Q, and loose collar, R, or their equivalents, in the manner and for the purposes described.

Second, The valve stem, L, formed with three bearing surfaces, m m′ m″, when connected by a floor, N, and operated upon by a suitable cam, h, in the manner and for the purpose explained.

Third, The elevated or projecting guide, G, or its equivalent, when combined substantially as and for the purpose set forth, with a valve stem formed and adapted to be actuated by a cam or other eccentric on the key stem in both opening and closing the valve.

Blarney E. Sampson, of Boston, Mass., for an Improvement in Pole Coupling for Railroad Cars. Patented July 7, 1858:

I claim making the mhuth or face of the bunter between the plates, a and b, entirely open at the sides and in front, so that the coupling of the pole may be easily made, whether it point directly forward or deviate to the right or left, substantially as set forth.

Second, I also claim sustaining the polo of a horse car in the proper position by means of the brace, G, substantially as described.

Frederick E. Sickels, of New York City, for an Improvement in Steam Engines. Patented Sept. 19, 1845:

I claim adjusting the expansion of steam in steam engines with the aid of an independent motion to determine when a weight or spring shall commence to close a separate moving cut-off valve for each end of the cylinder.

Frederick E. Sickels, of New York City, for an Improvement in Steam Engines. Patented Sept. 19, 1845:

I claim the combination of a cam, arm or wiper, moved by an independent motion, with a reciprocating trip and catch to liberate a weight, spring or other force that acts to close a cut-off valve.

Frederick E. Sickels, of New York City, for an Improvement in Steam Engines. Patented Sept. 19, 1845:

I claim liberating the closing weight, or apparatus to cut off, by the aid of an independent motion in combination with a regulating reservoir to resist the force and momentum of the rapidly moving parts in cutting off.

Frederick E. Sickels, of New York City, for an Improvement in Steam Engines. Patented Sept. 19, 1845:

I claim imparting a co-existing movement to two reciprocating catch pieces in the operation of trip cut-off valves.

Frederick E. Sickels, of New York City, for an Improvement in Steam Engines. Patented Sept. 19, 1845:

I claim an adjusting mechanism, so arranged that the relative position of its parts, during any portion of its movement by the engine, can be changed to alter the closing action of the weight that operates the cut-offs without altering the time or encountering the resistance of opening the two separate moving cut-off valves.

Frederick E. Sickles, of New York City, for an Improvement in Steam Engines. Patented Sept. 19, 1845:

I claim counterbalancing the weight of the lifting rods so as to relieve the engineer in working the engine by hand, and so that, when the engine is hooked on, they will exert their full force in descending to overcome any opposing friction.

ADDITIONAL IMPROVEMENT.

Josiah Ells (assignor to Jas. M. Cooper and Wm. S. Lavely), of Pittsburgh, Pa., for an Improvement in Revolving Fire-arms. Patented Aug. 1, 1854; reissued Sept. 6, 1859:

I claim, first, The combination of the cam, i, on the hammer and cam, i′, on the trigger, constructed and arranged substantially as described, for the purpose of drawing back the trigger and retaining it and the hammer at the point of full cock without the use of any pawl or catch to retain them in that position.

Second, The use in fire-arms cocking as well by hammer as by trigger, of a pawl, in combination with a notch on the front edge of the hammer, for the purpose of preventing the complete fall of the hammer and the discharge of the piece in case of the partial raising of the hammer or drawing of the trigger, substantially as described.

Third, The combination and arrangement of the cam, i′, and pawl, n, on the trigger and the cam, i, on the hammer, and stud, r, and lifter, y, on the trigger, so that their conjoined action will effect the entire operation of the arm, viz., in half cocking or full cocking the hammer and rotating the breech into position, locking it and setting the trigger in a drawn position, preparatory to the discharge, by the manipulation, of either the hammer or the trigger.

Fourth, The spring stop on the arbor or spindle and ratchet grooves in the bore of the cylinder in which it works, to prevent the backward rotation of the breech, in combination with the spring stop on the hammer spring and ratchet grooves on the external circumference of the breech in which in which it works, to prevent the forward rotation of the breech, for the purpose, by their combined action, of perfectly locking the breech in position before the hammer reaches the point of full cock, by either mode of manipulation, preparatory to firing.

Fifth, The lever and spiral spring in the trigger, combined and arranged as described, for the purpose of operating the vibrating stud.

DESIGNS.

N. S. Vedder (assignor to Abraham Cox, Joseph Cox and John Whitman), of Troy, N. Y., for a Design for a Cooking Stove.

Isaac De Zouche, of St. Louis, Mo., for a Design for Iron Railings.

James E. A. Gibbs, of Mill Point, Va., for a Design for a Sewing Machine.

H. S. Hubbell, T. H. Wood and J. E. Roberts, of Buffalo, N. Y., for a Design for Stoves.

William H. Smith, of Newport, R. I., for a Design for Stoves.

Notes & Queries

J. G. of Ind.—The claim of H. B. in his communication on page 83 of our present volume is, that by compression he avoids the loss of the steam which is required at each stroke to fill the space between the port and the piston. If he cut off at the proper point to save this, it does not follow that by cutting off sooner he would save more—he could not save more than the whole of what is now lost. Water in a close boiler does become hotter than 212°, not in an open boiler. Why the bottom of a boiling pot remains cool, if such is the fact, is to us a mystery. We should not want to live any greater length of time than would be required to pick a millstone with a glazier's diamond.

W. McC., of Ala.—The water taken up by a whirlwind in the form of a water-spout will be found to be salt when it falls to the earth. Most of the rain is formed of water which rises by evaporation, and this process does not carry up the salt.

C. L., of Conn.—A fall in the mercury of the barometer generally indicates approaching rain, a high wind, or a thunder storm; but it frequently rises prior to a snow storm. The reason of this is but imperfectly known.

C. A. P., of Ky.—An ambrotype can be copied photographically by transmitting the light through the glass in a dark room, and allowing the rays to fall upon the paper. We are not acquainted with any artist in this city who makes a practice of taking pictures in this manner, though several know how to do it.

G. L. B., of Maine.—There are plenty of oscillating steam engines so constructed that the trunnion itself is the valve, and the steam is shut off and taken in by the cylinder itself.

C. H. H., of Ind.—Smoke consists principally of carbon. The plan of burning it by passing it into a hot furnace has been in operation for several years; it is extensively practiced in England. An escape flue is necessary.

O. B. M., of Mass.—Your article on the Pemberton Mill is accepted, and will probably appear in our next issue.

J. W. S., of N. Y.—Your article on the obstruction of river navigation is accepted, and will appear soon.

C. W. K., of Ga.—We know of no liquid which will prevent insects from sucking the blossoms of apples and pears.

T. H. Y., of Ohio.—There can, of course, be no way of drawing all the wine from one cask into another on the same level without the use of power, applied either to a pump or some other apparatus.

A Subscriber, of Canada.—Bodies falling through a vacuum fall with the same velocity whatever their density or size. This is true only of bodies whose weight, compared to that of the earth, is inconsiderable. Planatery masses would fall with velocities proportioned to the quantity of matter which they contained.

J. D., of N. S.—It would be necessary to know more of the facts than you communicate in order to answer your question. How great is the present head? How large is the pipe through which the water flows? and how much water do you want to raise per day? We recommend you to write directly to the Allaire Works, this city.

F. F., of Kansas.—In commencing the study of chemistry, use only the most simple apparatus. A blow-pipe, spirit lamp, retort and a few glass tubes will enable you to perform quite a number of experiments Morfitt's "Chemical Manipulations," published by Lindsay & Blakiston, Philadelphia, is the most suitable work for your purpose. You can only obtain books published by government from members of Congress.

F. A. C., of N. Y.—Napoleon II. was the son of Napoleon I. and Maria Louisa, of Austria. He died young. The Sons of Malta constitute a secret order—great upon malt liquor, for ought we know to the contrary. We cannot give you the peculiar information desired about the microscopes which were advertised.

J. H. F., of N. Y.—The beautiful gloss to which you refer, upon marble and alabaster, is produced by rubbing the surface (after it has been reduced with emery and pummice stone) with a moist linen cloth and the powder of calcined tin. After rubbing with this for some time, take a cushion of soft dry cloth, or, what is better, a piece of soft white leather, and rub very lightly. Fine soft silk is the best substance to finish up the polish with, but it is seldom used.

G. P. D., of C. W.—There must be something wrong with your battery when you cannot get a copper deposit from a strong solution of the sulphate. It is a difficult matter to silver-plate cast-iron, but it has been done in some instances by having an excess of chloride of silver in the cyanide solution. Use stronger solutions than those you have yet tried.

J. J. B., of N. Y.—A windmill may be capable of doing all the work you want in a wagon shop, but you cannot depend upon it because it is not constant. A horse-power, we think, would be the cheapest which you could use in a small business. If it is not sufficient, we advise you to get a small steam engine.

J. B. B., of Fla.—Short iron chimney caps are not objectionable with lightning rods attached, if you have the lower part of the cap properly connected with the rod. All large pieces of metal, such as gutters and caps, about the roof and sides of the house, should be connected with the rod. The latter should be as large as possible, in order to carry off the most intense stroke with ease.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, Feb. 25, 1860:—

P. C., of Conn., $30; N. A. P., of Tenn., $70; J. M. B., of Iowa, $30; J. W. A., of Vt., $25; J. B. C., of N. Y., $55; C. E. H., of Mass., $30; J. W. C., of Fla., $250; B. B., of Ohio, $30; N. S. G., of N. Y., $30; N. A. S., of Ill., $30; E. & D., of Mass., $12; H. B. J., of N. J., $250; O. C., of Vt. $30; S. & M. of N. Y., $30; G. H. B., of Ill., $25; R. B., of N. Y., $25; B. S., of Va., $30; D. McK., of N. Y., of $20; J. S., of Ind., $10; H. S., of R. I., $30; J. D. B., of N. C, $25; S. A. Co., of N. Y., $30; C. M., of N. Y., $42; A. & W., of N. Y., $30; G. W. B., of Conn., $30; J. E. E., of Cal., $230; G. E. B., of Ill., $35; J. E. A., of Tenn., $20; E. B., of Ind., $30; F. S. M., of N. Y., $30; D. A., of Ohio, $30; G. W. D., of N. Y., $30; A. B. H., of Fla., $25; W. S., of Ill., $30; J. H., of N. J., $30; W. W., of Pa., $400; J. H. L., of N. Y., $30; A. S., of N. Y., $25; W. T., of Mich., $30; G. H. M., of Mass., $30; R. R., of Vt., $40; J. M., of Iowa, $30; R. M. L., of Minn., $70; H. N. & J. C. B., of Conn., $30; A. C. L., of Mich., $30; L. E., of Mich., $200; H. G. L., of Iowa, $30; J. T., of L. I., $25; G. W., of N. Y., $55; W. M. G., of Ohio, $25; T. F., of N. Y., $100; J. A. C. J. S., of Pa., $25; W. F., of Mich., $30; E. M., of N. J., $30; J. Y. H., of Pa., $12; J. S., of N. Y., $30; C. S. I., of Ind., $30; S. R. A. Co., of Conn., $276; P. J., of N. Y., $30; T. & R., of N. H., $25; D. D., of N. Y., $10; M. L. B., of N. Y., $30; C. R. S., of Vt., $30; T. G., of Ill., $30; E. K., of Pa., $25.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Feb. 25, 1860:—

J. B. C., of N. Y.; N. T. S., of N. Y.; J. A. C. J. S., of Pa.; J. M., of Ala.; J. W. A., of Vt.; W. E., of Texas; A. S., of N. Y.; C. G. C., of Ill.; J. Y. H., of Pa.; E. K., of Pa.; R. R., of Vt.; Mrs. S. D. C., of N. Y.; L. D. B., of N. Y.; R. P. B., of Miss; C. & P., of Ind.; J. T., of N. Y.; S. & L., of N. Y.; M. M., of Md.; G. W., of N. Y. (3 cases); E. & D., of Mass.; J. D. B., of N. C.; C. M., of N. Y.; J. H., of Pa.; A. H., of N. Y.; G. W. R. B., of La.; G. E. B., of Ill.; M. & M., of N. Y.; R. B., of N. Y.; A. B. H., of Fla.; R. I. G., of Md.; J. E. E., of Cal. (3 cases); F. B., of N. Y.

TO SEWING MACHINE MAKERS, PATENTEES, &c.—For sale, a correct copy, in books, of all the patent claims on sewing machines in the United States down to 1860. Valuable to any one in the business. Address C. A. DURGIN, No. 335 Broadway, New York. 1*

PLANT & BROTHER, NO. 14 NORTH MAIN-street, St. Louis, Mo., dealers in seeds and agricultural implements; also agents for the sale of iron and wood-working machinery, pumps, scales, engines, belting, hose and manufacturer's supplies. 10 12*

J. A. FAY & CO., WORCESTER, MASS., MAKE the radius planer and machine spoke-shave for crooked work and cross-grained lumber. It will chamfer, round, butt and smooth irregular and plain surfaces. Send for circulars. 1*

TO SEWING MACHINE INVENTORS, &c.—Just published, a "Digest of Patents on Sewing Machines," giving the substance of each patent down to 1860. Price $2. Sent per mail. Address C. A. DURGIN, No. 335 Broadway, New York. 1?

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TO INKSTAND MAKERS, PEWTERERS, &c.—The undersigned wishes to correspond with the above for the purpose of contracting to manufacture his "self-closing" inkstand, or to sell rights for the same. JAMES R. ENDER, Trenton, La. 1*

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STETSON'S MARYLAND HARVESTER.

The most striking proofs of the boundless field for improvement in mechanism is furnished by the history of the steam engine, the sewing machine and the harvester. While it is true that in each of them some leading idea is preserved in all the modifications, improvements are being constantly suggested in the subordinate parts, or in the combination, which are of very great value. We have had occasion to describe a large number of mowing machines, and we now present an illustration of one invented by W. S. Stetson, which is claimed, and apparently with justice, to possess some advantages over all others.

The vibrating cutter, *a*, Fig. 1, receives its motion through the rod, *b*, which is connected to the revolving wheel, *c*, near its periphery. The shaft of this wheel passes through the journal box, *d*, and has a beveled gear upon its end which meshes into the large gear wheel, *e*. The shaft of the wheel, *e*, has a pinion upon its end which gears into the large wheel, *f*, upon the axle of the carriage. The driving wheels, G G, turn upon the axle, but are connected with it by a pawl and ratchet, so as to turn it when they are moving forward but not to turn it in backing. Thus the vibrating motion is given to the cutter by whichever wheel may be moving forward in turning.

In mowing, the hight at which the grass is cut is regulated by varying the angle of the cutting points, and this is done by turning the frame to which the cutter is attached about its fulcrum on the axle of the carriage. For this purpose the lever, *h*, rises in a position accessible to the operator, its lower end being fastened rigidly to the frame and a pin being provided to hold it in any desired position. This pin is fastened to the lower end of a second lever, along side of lever, *h*, which has its fulcrum in the middle and its upper end pressed outward by a spring. The pin enters one of a series of holes in the solid part of the carriage, made in a curve concentric with the axle, so that, by grasping the two levers, the pin is drawn from the hole, when the lever may be turned, tipping the cutter to any angle desired, and by releasing the lever the pin enters such hole as it may be opposite to, holding the parts in their new position.

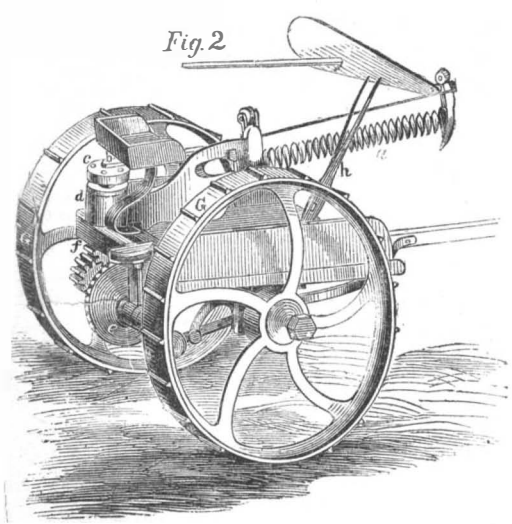
Fig. 2

In transporting the machine to the field the cutter is turned up and brought over to rest upon the top of the carriage, reaching forward by the side of the horse, as shown in Fig. 2.

To prepare the machine for reaping grain, the small rollers, *i i*, are replaced by wheels of such size as will raise the cutters to the proper hight, which wheels support the platform and the raker's seat.

The peculiar feature in this machine is the arrangement of the joints by which the cutter is attached to the carriage. There being two of these at right angles, the cutter adapts itself in the most perfect manner to the inequalities of the ground; that is, if one wheel passes over an elevation so as to turn the carriage, the cutter is not thereby tilted but preserves its proper position, and if a hollow or ridge is encountered, the cutter follows closely these inequalities; thus mowing the grass over the whole of the ground in the most perfect manner.

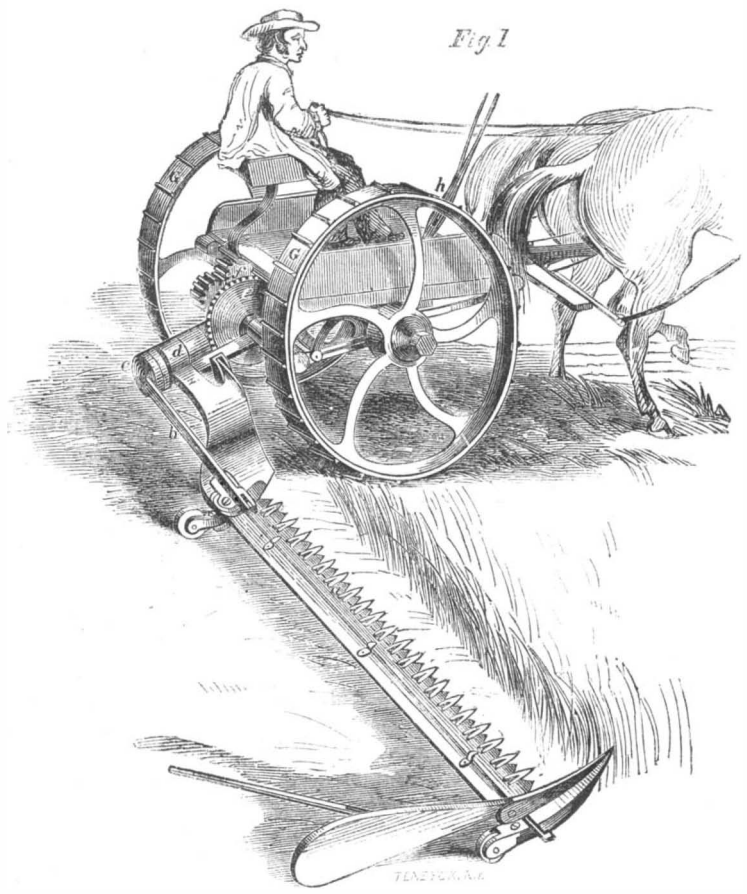
Fig 1

STETSON'S MARYLAND HARVESTER.

These two joints, it will be seen, being placed at right angles, are equivalent to one universal joint, and permit corresponding motions in all possible directions.

This invention is covered by three patents, issued Oct. 25, 1859, and persons desiring further information in relation to it will please address R. Sinclair, Jr., & Co., Baltimore, Md.

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GAS MONOPOLY.—We are glad to observe that an effort is being made successfully to establish a new gas light company, and destroy the much abused monopoly enjoyed at present by the Manhattan Gas Company. Gas is dearer at present than it should be, and the companies accumulate more money than they appear to divide, and by way of concealing what they do in this way, they keep adding largely to their capital by stock dividends, and then making dividends on the capital thus increased. The hundred dollar shares have been reduced to a mere nominal cost of ten dollars per share. The new company is the Metropolitan Gas Light Company, No. 402 Fourth-avenue. The president is Christian H. Sand, and the secretary is W. Titus. More on this anon.—*Wall Street Underwriter.*

A CHANCE TO MAKE AN ORIGINAL OBSERVATION IN ASTRONOMY.

The bright planet which is now very nearly overhead at 9 o'clock in the evening is Jupiter. It is in the edge of the constellation Gemini (the twins), the two bright stars near it at the north-east being Castor and Pollux. The motion of Jupiter among the stars is now retrograde, that is, from the east over towards the west, so called from its being in the direction opposite to the motion of the sun and moon among the stars. This retrograde motion of Jupiter can be observed by any one without the aid of any instruments. At the present time it will be seen to be in range with certain of the fixed stars, and a week hence it will be easy to see that it has moved over to the westward a little, in range with other of the fixed stars.

Below Jupiter to the east, about 27 degrees distant, is the planet Saturn. It is a little above the sickle in the constellation, Leo; the bright star, Regulus, in the end of the handle of the sickle, being almost directly below it, Saturn has the same retrograde motion as Jupiter. By considering the position of the sun down below the horizon, the motion of the earth eastward and downward at right angles to a line drawn from the earth to the sun, and that the orbits of Jupiter and Saturn are outside of the orbit of the earth, between us and the fixed stars, it is easy to understand the way in which the motion of the earth in its orbit causes this apparent retrograde motion of these two planets.

Since the above was written, while it has been lying in our drawer, the retrograde motion of the two planets, Jupiter and Saturn, has changed, and the motion is now direct; that is, from west to east, as any one may see. It is now very slow, but is becoming more rapid.

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